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This Week

In the construction of the Coulee Dam automotive equipment was made to do more than it was built for. The whole story right from the line of action can be found on page 46.

Changes do not always mean advancement but when they show as much progress as the engine displays at the Annual Motor Boat Show it is well to be informed. See page 49.

There are more engine drawings on pages 55 and 56.

The first of a series of tables showing the body and equipment specifications of 1937 passenger cars begins on page 58.

GM-UAW Parleys Near

Over 70,000 Idle as Conciliators Strive To Establish a Common Meeting Ground

Hopes rose for an early settlement of strikes called by the United Automobile Workers International Union and which have halted some 20 General Motors plants, throwing more than 70,000 employes out of work.

James F. Dewey, federal conciliator, was quoted as saying: "The one thing that is preventing a peace conference with General Motors officials and officers of the union sitting around a table and thrashing it out is the sitdown situation. The corporation refuses to agree to a conference until sitdown strikers have evacuated the plants. The union refuses to evacuate the plants until General Motors agrees there will be no attempt to resume production or move dies and machinery."

Governor Murphy, who accompanied Dewey to some of the conferences with both sides, reported that important developments might come in a short time and that the negotiations were moving forward satisfactorily. At the same time, GM officials reported that no conference has been scheduled and none was expected that evening.

Homer Martin, UAW president, had previously denied that he was seeking to establish a "closed shop" or that he wished it to be the "sole bargaining agency" recognized by the corporation.

It was reported that General Motors had agreed to negotiate on the following basis: that the corporation agree not to operate its plants that have been affected by strikes; that sitdown strikers must be called out of the plants they

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Plants Hold Pace

December Output Rate Maintained Thanks to Inventories

By Harold E. Gronseth

Crippled by widespread and persistent strikes, the automobile industry nevertheless has managed so far to maintain large scale production, but substantial curtailment is in prospect for the coming week unless settlement of its major labor dispute is reached meanwhile. Top-speed operations by plants unaffected by strikes largely offset the slackened pace of those afflicted and kept the overall rate of production during the past week at about the late December level.

The industry has demonstrated a high state of preparedness as well as characteristic resourcefulness in being able to carry on as well as it has in view of the many interruptions with which it

(*Turn to page 43, please*)

International photo

MAY, 1935: Seated at the Senate hearing on the Wagner Labor Bill were Alvan Macauley (left) president of Packard and the Automobile Manufacturers Assn. and Alfred P. Sloan, Jr., president of General Motors. Today, nineteen months later, the labor program of which the Wagner Bill was the bristling spearhead has brought for these men two enormous problems:

For Mr. Sloan: Leadership in an importunate strike involving as a cardinal principle the question of "closed shop" union contracts.

For Mr. Macauley: Leadership in determining the position of the rest of the automobile industry in the face of a possible "show down" with the CIO aided United Automobile Workers.

For additional strike interpretations see pages 38 and 39.

British Automotive Boom Slackens

Domestic Sales Increased 11% Against 24% in Previous Year; Passenger Car Exports Were 17% of Output

Output of the British automotive industry amounted to 461,947 units during the statistical year ended Sept. 30 and compares with 403,720 during the preceding 12 months, according to the report issued by the British Society of Motor Manufacturers and Traders. Passenger cars and chassis numbered 353,838, against 311,544, and trucks and buses 108,109, against 92,176.

Home market sales of British and imported cars increased from 271,704 to 302,057; this represents 11.1 per cent, a big drop in the rate of increase, for in the previous three years it had never been less than approximately 24 per cent. Home sales of buses increased by 8.7 per cent, a reduction in rate from 38.0 per cent, due to licensing restrictions that hamper the increase of existing long-distance services. Truck sales rose by 12.7 per cent after a 3.4 per cent increase in 1935 and a 33.4 increase in 1934. Sales of gasoline trucks weighing over 2½ long tons unladen fell by 24.8 per cent and heavy oilers by 10.0 per cent, licensing restrictions again being the cause, supplemented by the increased load capacity (up to 5 long tons in some cases) and popularity of trucks weighing less than 2½ long tons, for these are the largest with a legal speed of 30 m.p.h., the heavier types being limited to 20 m.p.h.

Registrations of passenger cars during the year under review showed again the preference accorded by British buyers to small cars; the 7 to 10 hp. group accounted for 59.6 per cent of the year's sales and the 11 to 15 hp. group for another 25.3 per cent. Thus, cars of 15 hp. and under fulfilled the demand of 84.9 per cent of British buyers. Sales of the 16 to 20 hp. and the 26 to 30 hp. groups showed a drop from 9.0 to 7.4 per cent and from 4.1 to 3.7 per cent respectively and although sales of the other two groups (21 to 25 hp. and over 30 hp.) increased by well over 100 per cent in each case, they represented together only 4.0 per cent of the British cars sold during the year. So it is evident that the horsepower tax concession (20s to 15s per hp.) of two years ago has not had the hoped-for effect of increasing the sale of medium sized and large cars.

Home sales of gasoline-engined buses and coaches decreased by about one per cent, but oil-engined public passenger vehicles had increased sales representing 28.6 per cent. This latter increase relates to buses for local services only, which the licensing commissioners usually allow to expand freely, whereas operators of coaches and long-distance bus services have the greatest difficulty in surmounting railroad opposition to extension of services. Oil engines are widely favored for local bus services and, beyond new

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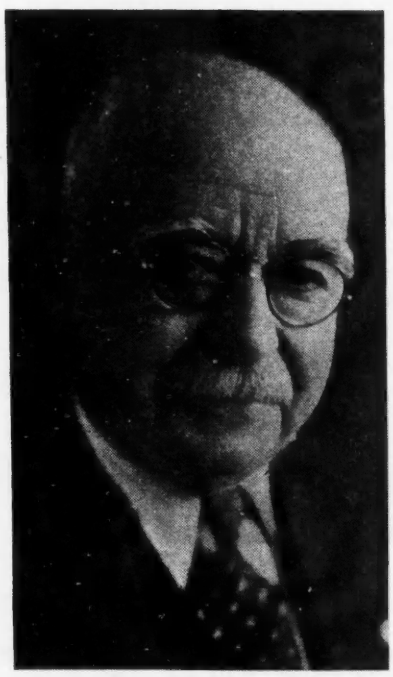
Tell Berna
general manager of the National Machine Tool Builders' Association

He Expands



Charles J. Bender, president of the Ahlberg Bearing Co., which has acquired a new plant

New Plant Acquired by Ahlberg Bearing Co.

The Ahlberg Bearing Co., Chicago, has taken possession of a new factory at Forty-Seventh and Whipple Streets which it has acquired on a purchase option lease. The plant is a modern building of 73,000 sq. ft. The company has started alterations of the building and will be in full production by May 1. The Ahlberg Bearing Co. was founded by Charles J. Bender, its president, in 1909.

Canadian Motor Vehicle Sales Up 12% for 11 Months of '36

An increase of more than nine per cent in volume and 12 per cent in value was shown in sales of new motor vehicles in Canada during the 11 months ending Nov. 30 compared with the same period in 1935. Sales of cars, trucks and buses totaled 104,037 valued at $107,316,480 against 95,375 at $95,697,471 in the 11 months ending Nov. 30, 1935. New passenger cars sold numbered 84,620 at $87,377,016 compared with 77,998 at $78,278,894 and new trucks and buses totaled 19,417 at $19,939,464 against 17,377 at $17,413,577.

Gains of 33 per cent were shown, both in number and amount of financing of motor vehicles in Canada during the 11 months ending Nov. 30, 1936, over the corresponding period of last year. Motor vehicles financed totalled 126,643 at $50,680,389, compared with 94,972 at $38,114,584 in the 11 months ended Nov. 30, 1935. New vehicles numbered 39,249 at $27,512,798, against 30,086 at $21,125,000, while used vehicles financed numbered 87,394 at $23,167,591, compared with 64,886 at $16,989,584.

Tell Berna General Manager Of Machine Tool Builders

Tell Berna, of Cleveland, has been named general manager of the National Machine Tool Builders' Association, according to an announcement by C. R. Burt, president.

Mr. Berna is a graduate of Cornell University with the degree of mechanical engineer. He has been general sales manager of the National Acme Co. of Cleveland for the past six years and before that was sales manager with the Union Twist Drill Co. of Athol, Mass.; the G. A. Gray Co., of Cincinnati; and office manager of the Cincinnati office of Cutler-Hammer, Inc. Mr. Berna succeeds Herman H. Lind who was general manager of the association from 1932 through 1936 and is now executive vice-president of the American Institute of Bolt, Nut and Rivet Manufacturers.

Mrs. Frida F. Selbert continues as secretary of the association.

ICC Motor Regulations Published

One Section Specifies Uniform Lighting and Brake Equipment for Interstate Carriers

Safety regulations applicable to interstate trucks and buses have been announced by the Interstate Commerce Commission under authority of the Motor Carrier Act of 1935. They cover four main parts: qualifications of drivers, basic rules for the driving of motor vehicles, and requirements as to parts and accessories necessary for safe operation, all of which are made effective as of July 1, 1937. Rules for the reporting of accidents will become effective April 1, 1937.

Issuance of the rules will make possible their use in the 40 state legislatures which are meeting this year. The regulations are made applicable to all common carriers and contract carriers subject to the act, except as to certain special operations enumerated in Sec. 203 of the act. They are not applicable at present to private carriers.

Of special interest to manufacturers of automotive equipment is Part III of the regulations relating to "parts and accessories necessary for safe operation." Sec. A prescribes that every truck or bus, whatever its size, shall carry two head lamps, one on each side, at the front; one reflector on the side and near the rear; and on the rear, one tail lamp, one stop light, and two reflectors. Every bus or truck 80 in. or more in overall width or 30 ft. or more in overall length shall carry in addition to the above the following lighting devices and reflectors:

If 80 in. or more in width and less than 30 ft. in length: on the front, two clearance lamps; and on the rear, two clearance lamps.

If 30 ft. or more in overall length: on the front, two clearance lamps; on each side two side marker lamps, one at or near the front and one at or near the rear, and one reflector at or near the front; and on the rear, two clearance lamps.

On every truck tractor there shall be on the front: two head lamps and two clearance lamps, one at each side if tractor cab is as wide as, or wider than, the widest part of any vehicle or vehicles being towed, on each side, one side marker located at or near the front; and at the rear, one tail lamp.

On every semi-trailer or full trailer having a gross weight in excess of 3000 lb. there shall be: on the front, two clearance lamps; on each side, one side marker at or near the rear, two reflectors, one at or near the front and one at or near the rear; and on the rear, two clearance lamps, one stop light, one tail lamp and two reflectors.

On every pole trailer having a gross weight in excess of 3000 lb. there shall be carried at each side one marker lamp and one clearance lamp; on the rear, one tail lamp; and on the rear of the pole trailer or load two reflectors.

On the rear of every full trailer, semi-trailer or pole trailer having a

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New Japanese Firm Formed To Make Junkers Diesels

Following the collapse of the first enterprise, the second Nippon Diesel Engineering Co., capitalized at 20,000,000 yen, has been founded by Lieutenant Colonel Kenzo Adachi and his associates. The new firm is a continuation and extension of the business of the other and will acquire the manufacturing right of the Junkers high speed Diesel engines. When the factory is completed, it will have a capacity of 70 engines a month in addition to automobile chassis, bodies, gears and anti-skid chains for automobile tires, all of which will be made on the specifications of the Junkers and Krupp firms of Germany.

Smart restyling of the radiator and front end of Federal trucks

Federal Restyles Line

Truck Radiators Set at Angle, Fitted With Rounded Grilles

Federal Motor Truck Co., which recently announced a line of cab-over-engine models, has now restyled its truck models of conventional type. The engine and dash have been moved forward 4 in. and the radiator shell, which is ornamented with stainless steel moldings, is set at a rakish angle and fitted with a rounded grille. Instead of the filler cap, which is under the hood, there is a chromium-plated ornament on top of the radiator shell. Louvres are provided with three parallel stainless-steel moldings, into the center of which the nameplate is fitted. Fenders are of the deep-crown skirted type. Running boards are lower than formerly, have deep rounded edges, and are equipped with rubber mats. The bumper is of spring steel. Large chrome-plated hub caps are standard equipment. A chromium-plated bumper, bumper guards, head lamps and fender parking lights are available at extra cost.

Two new cabs are offered for these models. The standard cab has a one-piece sloping windshield, while the deluxe has a V-type sloping windshield with dual windshield wipers. Both have one-piece steel roofs which are lined with steel with insulating material between the two sections. Clutch and brake pedals are fitted with rubber pads covering the floor slots. The dash is sealed with ½-in. insulating material, and the under side of the seat also is completely sealed.

Both cabs are 5 in. wider and 3 in. longer than the previous design, measuring 50½ in. in height, 29 in. in length and 60 in. in width. Other features include drop-skirt to the running board, a chromium-plated windshield frame, a felt-insulated rubber floor mat, and easy-operating window regulators. There is a large pocket under the right side of the instrument panel for delivery records. Seats are deeper and more comfortable.

There have been no changes in chassis features. Prices have been increased somewhat and now run as follows for standard-wheelbase chassis with standard equipment (at the factory): Model 15, 1½-2½-ton, with 6.00/20 six-ply front and 32 x 6 eight-ply single rear tires, $695; model 18, 2-3-ton, with 6.50/20 six-ply single front and dual rear tires, $925; model 20, 2-3½-ton, with 6.50/20 six-ply single front and dual rear tires, $1,075; model 25, 2½-4-ton, with 7.00/20 eight-ply single front and dual rear tires, $1,295; model 29, 3-4½-ton, with 7.50/20 eight-ply single front and dual rear tires, $1,745.

STRIKES:

The Contemporary Pattern

These photographs (some of them selected months ago) epitomize the broad course which most strikes follow. The complete record should include a picture of the Mahatma Gandhi, leading modern exponent of passive resistance.

ENCOURAGEMENT: Wyndham Mortimer, UAW first vice-president, tells Fisher Body strikers in Cleveland that their walkout is the crux of the battle for recognition. (Top left)

IDLENESS: Bored by waiting, sitdowners pass their time with games at the Cleveland Fisher Body plant. (Left)

Acme, International and Soibelman photos

VIOLENCE: When strikers and strikebreakers clashed during one of last year's "peaceful settlements," windows were broken by stones and gun fire. (Above)

BOREDOM: As the deadlock dragged on, workers who had occupied Fisher's Cleveland plant slept uncomfortably. (Above, right)

SHAME: Participants in a riot cover their faces when hauled into court. (Lower right)

Just Among Ourselves

It Won't Work, Mr. Martin

IN the present crisis, the management of General Motors has presented a magnificent example of the utility of orderly, disciplined procedure in the face of an immature, cloudy presentation of scattered grievances disguised as a great and holy principle.

With 20 of his corporation's 60-odd plants closed by, or because of strikes, Alfred P. Sloan, Jr., went to Detroit this week on "his regular bi-monthly visit, to consider certain routine matters in the company's operations."

His arrival in Detroit was preceded by a clear statement on the part of General Motors officials of a unified and logical program.

1. The corporation will not recognize any union as the sole collective bargaining agency for the corporation's employes.
2. No negotiations can proceed while the corporation's plants are illegally occupied by members of a union.
3. Plant and divisional managers are empowered to discuss with employes' representatives at any time the settlement of individual grievances.

If the United Automobile Workers International Union were in full control of the locals in its organization; if the present strikes were the orderly culmination of a determined effort to "close" the plants of the industry to other bargaining agencies; in other words, if the Union's program were as logical and consistent as that of the Corporation, there would be no difficulty in arranging a prompt settlement of the present disturbances.

But, as we see it, the present "united front" of the United Automobile Workers is a result of the necessity of "saving face" for certain local unions which started trouble without any concerted plan in mind. The first strike affecting a General Motors unit started six weeks ago. The International Union supported it, but with no thought, we believe, that it was the beginning of a united campaign against General Motors. Other isolated strikes broke out in Fisher body plants but slowly.

At this point, Homer Martin, president of the UAW, apparently mistook the brush fires of sporadic strikes for a three-alarm fire and rushed to W. S. Knudsen, executive vice-president of General Motors, with a peremptory demand for a discussion with General Motors' management on a bargaining policy to cover all plants.

Mr. Knudsen refused to be stampeded and, to continue the metaphor above, referred Mr. Martin to the corporation's local battalion chiefs for aid in fire fighting.

Martin Retreats from First Stand

A hasty conference of the heads of local unions was called in Flint for Sunday, Jan. 10. This time it was Mr. Martin's face which had to be saved and a noble attempt was made, in spite of the fact that many of those present at the conference must have recognized that a general strike order, directed against General Motors plants, and with its inevitable repercussions on other industries and the public, was premature and inadvisable.

We have a strong feeling that Mr. Martin was dazed by the apparent success of this conference. He continued for nearly three days the unqualified attitude that General Motors would have to be dealt with by the Union as a Corporation and that the negotiations would be concerned chiefly with the recognition of the UAW as the sole bargaining agency for workers in GM plants.

That such a position was tantamount — with or without a union contract — to seeking a closed shop Mr. Martin did not deny—for three days. At the end of that time his ecclesiastical background asserted itself, and a delicate hair-splitting operation disclosed that the closed shop was not the point of issue at all. Stripped of their metaphysical subtleties, we cannot see any essential difference between an argument for the recognition of the UAW as a sole bargaining agency and one for the effective establishment of a closed-shop agreement.

GM Holds Strong Economic Position

After a week of GM strike news on the front pages of most of the newspapers in the country, the corporation's stock maintains a strong position. This would seem to us to indicate continuing public confidence in the policies of the corporation and its ability to effect a not-too-costly settlement of its labor difficulties.

To a certain extent we believe the UAW has been deluded by its statisticians. In a statement issued Wednesday, in an effort to give contingent support to its General Motors argument, the UAW claims that Nash, Studebaker, Graham-Paige, and Willys-Overland are "not only friendly" but 100 per cent organized.

The organization figure is open to considerable question from two points of view. In our experience, barring an ironclad

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Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES

Activity in most economic lines was at a high level as the year 1936 came to a close, and the coming year is looked upon with considerable optimism in business and financial quarters. According to the Federal Reserve Bank of New York, the volume of production and trade during 1936 was about 15 per cent greater than in the preceding year and was the largest since 1930. Year-end bonuses and pay increases granted by a large number of companies are expected to stimulate trade during the next several weeks.

Carloadings Well Above '35

Railway freight loadings of the first 17 major railroads reporting during the week ended Dec. 26 amounted to 251,120 cars, as compared with 326,784 cars the week before and 209,070 cars during the corresponding period last year.

Power Output Steady

Production of electricity by the electric light and power industry during the week ended Dec. 26 was moderately above that in the preceding week and was 12.7 per cent above that in the corresponding period last year.

Christmas Shopping Good

According to the Federal Reserve Bank of New York, sales of department stores in the metropolitan area of New York during the first 24 days of December, usually regarded as the Christmas shopping period, were 12.5 per cent above those in the corresponding period last year. However, when adjustment is made for the number of shopping days, sales this year show a gain of 8.9 per cent.

Farm Prices Only 13% Under '29

Prices received by farmers for their principal crops last year were 26 per cent above those in the preceding year and were 13 per cent below the 1929 level, according to the Bureau of Agricultural Economics. It is pointed out that the higher prices reflect both a strengthened demand for agricultural products and smaller crops. The Bureau also stated that the world supply of wheat is now the lowest in 10 years; and, as a result, the trend throughout the world is toward greater production. The United States has planted more than 57,000,000 acres to winter wheat, which is the largest acreage on record.

Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended Jan. 2 stood at 88.8, as compared with 87.9 the week before and 87.3 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended Dec. 30 showed a decline of $4,000,000 in holdings of discounted bills. Holdings of bills bought in the open market and government securities remained unchanged. Member bank reserve balances increased $65,000,000.

GM Adds COE Models

Revamped 1937 Truck Line Includes Several Cab-Over-Engine Jobs

General Motors Truck Co. has announced its 1937 line of G.M.C. trucks, which includes a full range of cab-over-engine (COE) models and revised versions of the former conventional truck chassis. The smallest of the trucks offered, the ½-ton model, now comes in an additional short wheelbase of 112 in., and this lowest priced unit of the line has a base price of $395. All ½-ton trucks are now fitted with a new L-head engine of 230 cu. in. displacement, instead of the former 213-cu. in. engine. All other engines of the line are of the valve-in-head type.

The cab-over-engine models, which make up the F series, correspond closely to the conventional T series in respect to chassis components. Thus the F-16 is a cab-over-engine truck having the same engine, transmission, etc., as the T-16 conventional truck. However, owing to the greater proportion of the total load on the front wheels in the COE trucks, the front axles and steering assemblies are usually of the next larger size than in the corresponding T model. Chassis lay-out in both lines are quite similar, but the steering column angle is different and the control connections from the shift lever, the clutch, etc., are extended to make up for the more forward and higher location of the driver's seat. In order to make the controls just as accessible as in the conventional chassis, the valve-in-head engines are inclined sideways 18 deg.

In the cab-over-engine models the fuel tank is mounted at the side of the frame and the cab is provided with individual bucket-type seats instead of continuous seat cushions. Adjustments and minor repairs to the valves, plugs, carburetor and distributor can be made by removing the "insulated" engine cover and floor boards. Other engine service operations can be performed through the large openings in the cowl panels which are provided with doors. For overhauls the engine is slid out through the front of the chassis.

The cab-over-engine line extends from the F-16 of 1½-3-ton rating to the F-61 and F-61H, of 5-10-ton rating.

De Soto Convertible Coupe Added to Line

Production of a new convertible coupe, featuring a double frame construction that gives it unusual rigidity, was announced last week by the De Soto division of the Chrysler Corp. Use of new types of insulation seals out cold and heat as well as noise. Felt and rubber draft eliminators, and weather-stripping around the doors make the cars comfortable for winter driving. At the same time, an easy-folding top that fits into a recess in the back of the body makes the car an open roadster for summer driving.

In addition to the strongly braced X-type chassis frame used for all De Sotos, there is a special frame built into the convertible body and mounted on top of the chassis frame.

At the purchaser's option, a top made of black duck may be had instead of the usual tan top. This new colored roof not only blends with the body colors of the line but also keeps its clean appearance in soot laden city air. The coupe seat is 2½ in. wider this year than before. More head and foot room have also been provided. The spare tire has been placed back of the front seat.

American Chain Changes Name

American Chain & Cable Co., Inc., is the new name of the American Chain Co., Inc., since 1924 a producer of wire ropes and cables for all purposes as well as chains.

40 Years Ago

with the ancestors of AUTOMOTIVE INDUSTRIES

In his very interesting lecture on motor vehicles delivered recently before the Automobile Club of France, M. Marcel Desprez, member of the Institute, presented a decidedly novel objection to the petroleum road motor. The learned gentleman is haunted by the fear that if this fuel comes into general use for vehicle propulsion we shall sooner or later be brought face to face with an oil famine because only 8,000,000 tons of oil are annually taken from the earth while 400,000,000 tons of coal are mined annually.

In his desire to force steam to the front as a motive power for road vehicles, M. Desprez has borrowed a great deal of trouble from the future . . . Coal mining is a much older industry than the oil industry, and the production of oil is now increasing as its uses multiply. Under the stimulus of a great demand from a vast and newly created industry we may expect new fields will be discovered and improved methods of raising the liquid be introduced so that in the present generation, at least, an oil famine seems impossible.

—From *The Horseless Age*, January, 1897.

O. W. Franke
appointed master mechanic of Plymouth Motor Corp.

40-Hour Week Begins in French Motor Industry

The 40-hour week, applicable to all the engineering trades, has just been applied to the French automotive industry, including garage workshops. As a general rule the factories will now work eight hours per day, with a five-day week. The new law has made little difference to the internal arrangements of the factories since very few firms are working a full 40 hours per week.

As the men are entitled to the same pay for 40 hours as for 48, an increase in the selling price of cars is inevitable. The increase began with devaluation and although still continuing, has not yet reached its full effect. Raw materials and partially finished articles are still rising on the French market. The effect of these increases is feared most by the manufacturers of high-priced and medium-priced cars, the sale of which is most likely to be affected.

The branch of the Renault factory producing army tanks has just been nationalized under the new law calling for the nationalization of all works producing war material. While operating as a part of the Renault factory, the tank department is now a separate entity, known as the Atelier de Construction d'Issy les Moulineaux.

Trailer Coach Manufacturers May Hold Own Show in Spring

The probability that the Coach Trailer Manufacturers Association will break away from the automobile shows and stage a show of its own has been growing ever since the shows in November. Feeling among manufacturers of coach trailers is virtually unanimous that holding the show for their product in the fall is of little or no benefit.

Carl W. Schelm, of the Schelbro Co. of Peoria, Ill., president of the association, told AUTOMOTIVE INDUSTRIES, that he had "heard of a plan to stage a national coach trailer show early in the spring." Mr. Schelm expressed the belief that such a step might serve to inaugurate a highly successful season for the industry.

Fink of Mack Trucks Elected AMA Director

At the last meeting of the board of directors of the Automobile Manufacturers Association, William F. McAfee of the International Harvester Co., was elected vice-president of the commercial car division.

E. C. Fink, president, Mack Manufacturing Corp. (Mack trucks) was elected a director of the Automobile Manufacturers Association to fill the unexpired term of A. J. Brosseau.

Registrations Up 23% for 11 Months

GM Group Leads with 43% of Total, Chrysler Accounts for 25% While Independents' Share Rises to 9.38%

New Passenger Car Registrations

	November 1936	October 1936	November 1935	Eleven Months 1936	Eleven Months 1935	Per Cent Change, 11 Mos., 1936 over 1935	Per Cent of Total Eleven Months 1936	Per Cent of Total Eleven Months 1935
Chevrolet	63,094	28,241	57,379	849,698	592,913	+ 43.1	27.61	23.65
Ford	27,694	45,710	56,578	685,187	771,925	− 11.2	22.27	30.79
Plymouth	42,726	30,332	30,321	452,903	350,454	+ 29.3	14.72	13.98
Dodge	18,505	14,776	15,897	224,785	161,791	+ 39.2	7.30	6.45
Oldsmobile	4,591	3,942	13,358	158,761	135,163	+ 17.6	5.16	5.39
Pontiac	12,694	6,757	11,409	152,264	129,111	+ 18.1	4.95	5.15
Buick	16,200	8,688	12,612	139,202	75,344	+ 85.0	4.52	3.01
Terraplane	5,381	3,421	3,962	70,274	47,801	+ 47.0	2.28	1.91
Studebaker	5,739	7,202	1,968	61,271	35,575	+ 72.5	1.99	1.42
Packard	6,963	8,453	4,493	61,243	33,493	+ 82.9	1.99	1.34
Chrysler	4,809	2,550	1,128	51,186	36,984	+ 38.5	1.66	1.48
De Soto	3,541	2,417	1,350	39,464	24,543	+ 60.9	1.28	.98
Nash-La Fayette	3,351	2,134	2,168	38,019	32,078	+ 18.8	1.24	1.28
Hudson	1,453	957	1,859	18,912	19,278	− 1.8	.61	.77
Graham	1,070	1,059	757	14,971	14,890	+ 0.4	.49	.59
Lincoln	1,696	1,778	180	13,500	1,578	+757.0	.44	.06
Willys	556	968	1,137	11,297	9,385	+ 20.5	.37	.37
La Salle	1,433	503	1,173	10,953	10,756	+ 1.9	.36	.43
Cadillac	968	613	1,055	10,381	5,562	+ 86.8	.34	.22
Reo	125	203	233	3,067	3,605	− 14.8	.10	.14
Auburn	83	83	263	1,796	4,918	− 63.5	.06	.20
Hupmobile	10	19	359	1,544	6,966	− 77.8	.05	.28
Cord	51	91	.....	1,087	.....	.....	.04	.....
Pierce-Arrow	54	62	73	741	796	− 6.8	.02	.03
Miscellaneous	773	360	552	4,688	1,825	+155.5	.15	.09
Total	223,560	171,319	220,262	3,077,194	2,506,714	+ 23.0	100.00	100.00
Chrysler Corp.	69,581	50,075	48,696	768,336	573,772	+ 34.0	24.97	22.89
Ford and Lincoln	29,390	47,488	56,758	696,687	773,503	− 9.5	22.71	30.86
General Motors	98,980	48,744	96,984	1,321,259	948,849	+ 34.3	42.94	37.85
All Others	25,609	25,012	17,824	288,910	210,590	+ 37.3	9.38	8.40

New Truck Registrations

	November 1936	October 1936	November 1935	Eleven Months 1936	Eleven Months 1935	Per Cent Change, 11 Mos., 1936 over 1935	Numerical Change, 11 Mos., 1936 over 1935	Per Cent of Total Eleven Months 1936	Per Cent of Total Eleven Months 1935
Chevrolet	10,089	7,947	10,875	189,533	154,654	+ 22.8	34,879	33.28	32.61
Ford	5,178	11,666	14,191	165,347	172,084	− 4.0	−6,737	29.04	36.50
Dodge	5,313	7,541	4,642	80,880	56,854	+ 42.4	24,026	14.20	12.06
International	4,881	6,642	4,136	66,310	49,419	+ 34.1	16,891	11.64	10.48
G. M. C.	1,264	2,788	783	25,187	10,098	+151.8	15,089	4.42	2.14
Diamond T	688	987	378	7,985	5,941	+ 34.3	2,044	1.40	1.26
White	542	616	334	5,331	2,934	+ 82.0	2,397	.94	.62
Reo	254	529	273	3,931	4,550	− 13.6	−619	.69	.97
Mack	399	509	137	3,795	1,374	+177.0	2,421	.67	.29
Studebaker	205	347	137	3,063	2,001	+ 54.0	1,062	.54	.42
Federal	230	280	227	2,696	1,987	+ 35.8	709	.47	.42
Plymouth	40	85	35	2,378	540	+339.0	1,838	.42	.11
Willys-Overland	163	253	202	2,297	2,083	+ 10.2	214	.40	.44
Terraplane	75	59	13	1,736	622	+179.0	1,114	.30	.13
Brockway	134	155	116	1,590	1,134	+ 40.1	456	.28	.24
Indiana	115	194	102	1,560	730	+114.0	830	.27	.15
Autocar	180	160	89	1,286	844	+ 52.4	442	.23	.18
Stewart	99	135	91	1,194	781	+ 53.0	413	.21	.17
Divco	71	88	23	911	312	+192.0	599	.16	.07
F. W. D.	32	22	26	319	191	+ 67.0	128	.06	.04
Sterling	37	38	17	247	157	+ 57.2	90	.04	.03
Twin-Coach	4	.....	6	91	130	− 30.0	−39	.02	.03
Miscellaneous	209	188	102	1,772	2,005	− 11.3	−233	.32	.44
Total	30,222	41,207	36,935	569,439	471,425	+ 20.8	98,014	100.00	100.00

Just Among Ourselves

(*Continued from page 39*)

closed-shop contract with a union, there is no such thing as 100 per cent organization in any plant. The second point of view was ably stated by Mr. Sloan before he left for Detroit. It's a fact that neither the union nor the corporation can be sure of how many workers in a given plant can be counted on for regular union support.

Without real proof of its right to represent even a majority of General Motors workers, it is ridiculous for the UAW to claim the right to be recognized as the sole bargaining agency in General Motors plants.

There are nearly a score of other considerations which enter into the present controversy. Paramount is the issue of whether General Motors' difficulties will spread immediately to the other plants in the industry. We do not believe that the UAW intends they should. But we do not believe that the central management of the UAW is in full control of what may happen. If the strike spreads, it may be as costly in loss of prestige to the present management of the UAW as it will be in dollars to industrial management.

Whichever way you look at the whole situation, we believe we are justified in saying to Mr. Homer Martin "It won't work."—HERBERT HOSKING.

GM-UAW Parleys Near

(*Continued from page 35*)

now occupy; and that the company will recognize the union as the representative of its members, but not as the collective bargaining agency for all workers in GM plants.

John Thomas Smith, general counsel of General Motors, stated that at the time of application he had no knowledge that Judge Black was a stockholder of the corporation. Immediately upon learning from the stock records that Judge Black appeared as the holder of 1000 shares of its common stock, the local counsel at Flint was instructed to procure a transfer of the cause to another circuit judge. An order was entered Jan. 7 transferring all further proceedings in the cause to the circuit judge of Genesee County.

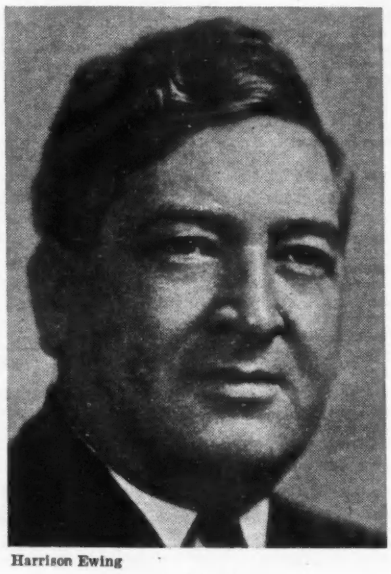
The total number of General Motors workers who were out of work at the end of the week because of strikes was 72,429. At Flint, Mich., alone the number of idle reached 14,575.

Latest plants to be closed were the Chevrolet engine factory at Flint, the Chevrolet gray iron foundry at Saginaw and the Chevrolet carburetor plant at Bay City, Mich.

General Motors accepts the principle of collective bargaining, Mr. Knudsen stated last week in his reply to Homer Martin's letter requesting a meeting. The corporation "desires to maintain satisfactory relations with all its employes regardless of union or non-union affiliations," Mr. Knudsen's letter continued. With plants located in 35 separate communities, in 14 states, and with more than 200,000 employes, grievances can only be handled locally where both parties are familiar with local conditions, is the position of the company. Furthermore, plant managers cannot bargain collectively with representatives of a fraction of their employes, which, the corporation stated, was the case of the UAW in many of its plants. Sitdowns were called without any attempt on the part of the union to negotiate, it was also stated.

In a letter to Mr. Knudsen dated Dec. 31, Homer Martin accused General Motors of widely employing espionage, having "hundreds, if not thousands, of spies" and of thus exposing workers to "systematic discrimination." He ascused the corporation of building plants where the labor movement seemed to be weak. "Your piece, point, and group methods of pay, arbitrarily announced and practiced, have led to innumerable hardships for your employes," his letter further read.

In discussing union relations with automobile manufacturers in general,



Harrison Ewing

James F. Dewey
Federal Labor Conciliator

Martin listed two groups, the first consisting of Nash, Studebaker, Graham-Paige and Willys-Overland, which he termed was "not only friendly but 100 per cent organized and having a fine relationship existing with the managements"; the second group, consisting of Chrysler Corp., Hudson Motors and Packard, were "fair to the union."

Martin added that Studebaker recently granted wage increases ranging from 5 to 25 cents an hour, in conferences with the union committee, affecting 8000 men in South Bend and 1000 in Los Angeles. Average per hour in the South Bend plant prior to the increases was 87 cents per hour, according to Martin.

GM Strike Since Jan. 1

Jan. 1. Chevrolet forge plant in Detroit forced to close to prevent piling up of materials.

Jan. 2. Judge Edward D. Black, of the circuit court at Flint issues injunction ordering strikers to vacate two Fisher Body plants in Flint. Strikers restrained from interfering with ingress and egress to plant, from interfering with delivery of material, injuring property and using any form of intimidation to prevent employes who desire to work from entering plants. An injunction was served on UAW officials and read to stay-in strikers. Court order disregarded by strikers. Forcible ejection was deferred while both sides considered legal procedure.

Jan. 3. UAW calls conference at Flint of delegates from locals in GM plants throughout the country. Delegates from 40 union locals represented in the GM council of the UAW voted authority to call a general strike in all 69 plants of GM at discretion of UAW president Homer Martin. Strike coalition with flat glass workers' union voted. Board of strategy was set up which in turn appointed subcommittees such as a national relief committee, national citizens committees to create favorable public sentiment, national publicity committee and negotiating committee. Eight demands for settlement of strike were drawn up as follows:

1. A national strike settlement conference with GM management.
2. Abolition of piece work and adoption of hourly rates.
3. Thirty-hour week.
4. Minimum rates commensurate with American standard of living.
5. Reinstatement of all employes who have been unjustly discharged.
6. Seniority based on length of service.
7. Recognition of UAW as sole bargaining agency.
8. Regulation of speed of production by mutual agreement.

More than 100 attended the conference, including CIO representatives and Glen McCabe, president of the flat glass workers' union.

Jan. 4. Delco-Remy plant, Anderson, Ind., with 11,707 employes, was closed by the management.

Demands for wage increases, union recognition and changes in working conditions, were presented to Cadillac Motor Co. and Fleetwood Body division and the management given until 4 p.m. Thursday to answer the union's demands. Mass meeting was called for Thursday night.

Senator LaFollette responds to UAW appeal by sending two representatives, C. C. Kramer and Ben Allen, to Flint.

Policemen and two strikers injured in a clash between pickets and police at a closed Fisher plant in Cleveland after pickets refused to let office workers enter plant.

Jan. 5. Union headquarters in Detroit assert that Circuit Judge Edward D. Black, who issued the injunction

"No Dictators"

Alfred P. Sloan, Jr., asked GM workers: "Will you pay a private group of labor dictators for the privilege of working?"

against strikers in Flint, is the owner of 3665 shares of GM stock and challenged his right to act in the strike matter.

Janesville body plant of Fisher and Chevrolet assembly plant closed by sitdown strikes with 2000 of 2500 employes remaining in plants.

Ternstedt Mfg. Co., Fisher division making body hardware, lays off 7000 of its 12,000 employes.

Fisher Lumber Corp. plant at Memphis, Tenn., lays off 800 workers.

Federal conciliators, James F. Dewey, Edward C. McDonald and John E. O'Connor, confer with union officials.

Alfred P. Sloan, Jr., issues a statement of the corporation's policy which is posted in all 69 plants. Refuses to recognize any one union as sole collective bargaining agency. Assures employes that no union or labor dictator will dominate GM plants.

Union members at Anderson, Ind., impound freight trucks carrying batteries from the Muncie, Ind., plant. Strikers organize road patrol to halt trucks carrying GM products within a 50-mile radius of Anderson.

General Motors made public Jan. 6 a list of its plants then closed as a result of strikes or in which operations have been curtailed from this cause. Those closed by strikes are: Guide Lamp plant, Anderson, Ill.; Fisher Body plant, Atlanta, Ga.; Fisher Body plant, Cleveland; Fisher Body plants Nos. 1 and 2, Flint, Mich.; Chevrolet assembly plant and Fisher Body plant, Janesville, Wis.; Fisher Body plant, Kansas City, Mo.; Chevrolet assembly plant and Fisher Body plant, Norwood, Ohio; Chevrolet transmission plant, Toledo, Ohio.

The Delco-Remy plant at Anderson, Ind., was closed because of sufficient inventory and the closing of plants using its products. Plants in which operations have been curtailed are: Moraine Products, Inland Manufacturing, Delco products and Delco brake plant, Dayton, Ohio; Ternstedt Manufacturing, Detroit; and the GM stamping division, Grand Rapids, Mich.; and the Hyatt Roller Bearing division at Harrison, N. J. Assembly plants which have shut down from a shortage of bodies are: Chevrolet, Atlanta, Ga.; Buick and Chevrolet engine assembly lines, Flint, Mich.; and the Chevrolet assembly plant, Kansas City, Mo.

Bohn Aluminum Deadlocked

Sitdown strikers continued to occupy plant No. 3, Bohn Aluminum & Brass Corp., closed since Dec. 28. This is the permanent mold plant which supplies pistons to a number of automobile manufacturers. The management refuses to enter into any negotiations with the union until strikers leave the plant. The union asks recognition as the exclusive bargaining agent, minimum wage rates and increases. Prolonged closing of the Bohn factory would result in stoppage of work by a number of independent automobile manufacturers who use Bohn pistons.

Briggs Mfg. Co. Hit

The Meldrum Avenue plant of the Briggs Mfg. Co. in Detroit, which makes bodies for Lincoln Zephyr and employs 1600 men, closed Jan. 7 as a result of a sitdown in two departments caused by discharge of union men, it was reported at UAW headquarters. Company officials declined to comment.

Their Pay the Highest

Highest weekly earnings of workers in 25 manufacturing industries are enjoyed by those of the automobile industry, according to figures compiled by the National Industrial Conference Board. The $36.16 per week paid workers in this industry is 40 per cent higher than the general average of $25.84.

The hourly rate of 79.3 for automotive wage earners is second only to the 87.2 cents paid news and magazine printers. Average hourly rate for the 25 reporting industries was 62.4 cents per hour. The figures are based on reports for November, 1936.

Glass Strikers Still Deadlocked

Efforts to mediate the flat glass workers' strike in Pittsburgh and Toledo seemed to rest this week largely on developments in the UAW strike against General Motors. Ralph Lind, special mediator assigned to the Libby-Owens-Ford strike, has been unable to bring together the local union committee and company officials, largely because Glen L. C. McCabe, union president, is reported to have ordered the union not to enter negotiations at present.

In Toledo, idle workers of both Chevrolet and Libby-Owens-Ford have been seeking relief. Authorities of Ross Township, in which the glass plants are located, voted an emergency relief fund of $500 to be paid only to men willing to work on the roads at the rate of $4 a day.

"Never Refused Meeting"

William S. Knudsen wrote Martin: "General Motors accepts collective bargaining. . . . Representatives of your organization have never been refused a meeting"

Washington Watchful

Though outwardly calm, the Administration in Washington manifested an undercurrent of tenseness over the General Motors Corp. strike situation. Secretary of Labor Frances Perkins discussed the labor situation generally with President Roosevelt on Tuesday and it also was the source of general discussion at the Cabinet meeting on that day. The President said that the automobile labor situation was part of a broad discussion of the general labor situation he had with Miss Perkins, indicating that no definite plans have been made by the Government to intervene.

It is understood that in reply to an inquiry, John L. Lewis was assured needy workers would be placed on WPA rolls.

Plants Hold Pace

(*Continued from page 35*)

has had to contend since 1937 model production was started. The very policy it adopted to help labor, that of building up heavy inventories of parts and materials during the slack period for car assembling, has proved to be a formidable weapon against the unions. These big inventories have enabled the car manufacturers to carry on long after their supplies were interrupted by strikes. Although 95 per cent of the glass supply was cut off weeks ago, car production has not suffered as yet. Glass stocks on hand are said to be good for another two or three weeks but such limits were heard weeks ago. The bin seems to be getting constantly deeper. Unquestionably, other sources are being found.

West, Meet East!

Here Are the Men Behind Japan's Bid for a Place as a Motor Vehicle Manufacturing Nation

No. 1. Gisuké Aikawa

"A Colonel Lawrence of business—a mystery man of industry," is the way Japanese describe Gisuké Aikawa, president of the Nissan Jidosha Co. His career proves that wherever there is a new and growing industry there is opportunity for a man to rise from humble beginnings to a high position.

Gisuké Aikawa was born Nov. 6, 1880, in Yamaguchi-ken; was graduated from Imperial University, Tokyo,

Gisuké Aikawa

in 1903, having specialized in mechanics; and then became assistant engineer in the foundry of the Shibaura Engineering Works. His desire to know more about his profession brought him to the United States where for several years he studied advanced casting technique. He returned to Japan when the World War broke out and founded and managed a small foundry business.

Now ranking among the industrial magnates of Japan, Mr. Aikawa owns the controlling interest in the nation's largest holding company, the Nihon Sangyo and is also president of a dozen important industrial and financial enterprises. One of his companies much in the limelight of late is the Nissan Jidosha, which manufactures Japan's first mass-production car, the baby "Datsun." This factory is now under the management of Soji Yamamura, a personal associate of Aikawa from his early foundry days.

Nissan Jidosha, still a relatively small company with only 10,000,000 yen capitalization, forms a strategic base for further expansion in the automotive industry. When the increase of capital and producing capacity now under way is completed, the Tsurumi plant is headed for what many believe may become leadership of the industry in Japan.

Hitachi, Ltd., another Aikawa company, which hitherto has made "everything electric from fans to streamlined locomotives," is soon to be expanded to include Diesel trucks among its products. A yearly schedule of 3000 units this year has been announced.

(*This is one of a series of six brief biographies of Japanese motor vehicle executives.*)

Court Appoints Trustees to Administer Marmon Assets

A reorganization of the Marmon Motor Car Co., setting up a board of trustees to administer all property, has been approved by Judge Robert C. Baltzell, of the southern district, Indiana Circuit Federal Court.

The trustees, Otto J. Feucht, Archie Anderson, Detroit, and Homer H. Davidson, Grand Rapids, Mich., will have broad powers under the plan to manager, lease or liquidate the holdings of the defunct Marmon company over a long period. Creditors are to receive proceeds until they have been paid in full, if possible.

Value of the company, at present, is said to be about $1,355,500 with creditor claims totalling $1,600,000. In the event of increase in value of the assets exceeding the amount of claims, surplus would be prorated among stockholders of record at the time of the original receivership in a state court in Indianapolis.

A report by the receiver under state court administration showed that $351,575 has been realized from the sale of property and from rentals. Of that amount, $305,835.59 was spent in operating costs, taxes, preferred claims, a three per cent dividend to creditors and fees for the receivers, attorneys and appraisers.

$2,500,000 for Roads In Public Land Areas

The Secretary of Agriculture has announced the apportionment of $2,500,000 for the construction of main roads through unappropriated or unreserved public lands, non-taxable Indian lands, or other Federal reservations other than national forests during the fiscal year 1938. Authorizations for this class of work were first made in 1930 and the new apportionment brings the total funds apportioned to $17,500,000. Previous authorizations have provided for the construction of more than 1400 miles of road.

Passenger Car Production by Wholesale Price Classes

(U. S. and Canada)

First Eleven Months 1936 and 1935 Compared

	1936	1935	Per Cent Change	Per Cent of Total 1936	Per Cent of Total 1935
Under $500	1,795,352	1,776,931	+ 1.2	53.36	58.56
$501-$750	1,415,033	1,121,697	+26.3	42.05	36.97
$751-$1000	105,898	95,284	+10.8	3.15	3.14
$1001-$1500	34,474	25,186	+37.0	1.02	.83
$1501-$2000	9,826	8,089	+22.0	.29	.27
$2001-$3000	3,943	4,861	−18.9	.12	.16
$3001 and over	284	2,070	−86.3	.01	.07
Total	3,364,810	3,034,118	+11.0	100.00	100.00

Truck Production by Capacities

(U. S. and Canada)

First Eleven Months 1936 and 1935 Compared

	1936	1935	Per Cent Change	Per Cent of Total 1936	Per Cent of Total 1935
1½ tons and less	681,417	625,286	+ 9.0	92.97	93.69
2 to 3 tons	36,246	31,812	+13.9	4.95	4.77
3½ tons and over	7,793	5,845	+33.4	1.06	.88
Special and buses	7,459	4,433	+68.3	1.02	.66
Total	732,915	667,376	+ 9.9	100.00	100.00

Automotive Metal Markets

Automobile Strikes Curtail Steel Output in Shenango and Mahoning Districts, While Chicago Is Unaffected

By William Crawford Hirsch

"Hold" orders from automotive customers have forced some steel finishing mills to revise radically their production schedules and in some instances to suspend cold process operations.

The effect of the strikes in the automobile field on steel mill operations appears to be more acutely felt in some steel-making districts than in others, relatively little interruption having been noted so far in shipments to automotive customers by Chicago district steel producers, while curtailment of output in the Shenango and Mahoning Valley plants is much more in evidence.

The steel industry's attitude toward the problems growing out of the inability of some of its automotive customers to take shipments, as arranged at the time the orders were placed, is to await further developments before doing more than minimizing as much as possible the clogging of mills with unbelievable accumulations. Shut-down of some units is an eventuality contingent upon what the next few days may bring forth.

Steel producers are more than eager to cooperate in every possible way with their automotive customers in this emergency, so much so that the price status of shipments, should they be delayed beyond the originally intended dead-line by "hold" orders, has so far not even come in for discussion. It is noteworthy that the head of one of the large steel companies has come out with a declaration that mere tonnage is no longer an indication of the state of the steel business and that steel has become largely a quality product, designed to the individual uses of consumers, this being especially true of steel going into automobiles. While end-of-the-year statistics indicate that automotive consumption in 1936 absorbed slightly less of the entire tonnage output than in 1935, the automotive industries continue undisputed in their leadership as the largest outlet for the products of the steel mills. The dollars and cents value of the steel bought by automobile manufacturers would make this fact stand out even more impressively than a comparison in tons. That the steel industry is well aware of this, is best shown by the fact that the number of sheet and strip mills of the continuous, automatic type, operating almost entirely for the automotive market, was augmented by three last year, with six additional ones now under construction, making 24 in all, with a total annual capacity of 11,000,000 tons.

Pig Iron—The market continues firm and unchanged, with new buying by automotive foundries rather light.

Aluminum—Firm and unchanged.

Copper—Producers announced 12 cents as their selling price on the last day of the old year. Corresponding advances in copper and brass products followed. Despite the 4 cents per pound import duty on copper, there is more and more talk of the possibility of imports. At the rate of consumption in the last quarter of 1936, reserve stocks are equivalent to about three months' requirements. The large producers, however, can step up production considerably.

Tin—The situation in the automobile industry is blamed for the unsettlement of the market, spot Straits being quoted at the week's beginning at 51¼ cents, ½ cent down from the previous close.

Lead—Steady with good demand from storage battery makers.

Zinc—Quiet and unchanged.

American Management Assoc. To Discuss Labor Problems

With labor crises developing rapidly on a nation-wide front, the American Management Association has issued a call to 2182 companies in its membership and to industry at large to attend a conference in Philadelphia Feb. 9-11. The association is taking a serious view of the situations developing in industrial centers throughout the country, it stated through its president, Alvin E. Dodd. The association advised its members that the conference would be conducted largely on a laboratory basis, with discussion of specific employer-employe situations.

Among the subjects that will come under discussion are: the formulation of labor policy; employe representation; trade union agreements; technique of wage negotiations; problems of personnel administration in connection with social security; the development of executive ability in a business organization; and others.

The Chain Belt Co., Milwaukee, Wis., has announced publication of three bulletins descriptive of Rex **roller chain**, Rex **grip-lock chain** and Rex **Z-metal chain***

A new catalog of the entire line of Oster-Williams **pipe and bolt threading equipment** and **welding equipment** has been issued by the Oster Mfg. Co., Cleveland, Ohio.*

Complete specifications and installation data on six types of **pillow blocks** are contained in the 1937 catalog just issued by Randall Graphite Products Corp., Chicago.*

A booklet describing **running gear and brake equipment for house trailers** has been brought out by the Vacuum Power Equipment Co., Detroit.*

The Houghton Line, December-January issue, gives an idea of the unusual facilities for research of E. F. Houghton & Co. This issue shows some of the test equipment and cites some of the work done in developing Vim Tread belting.*

The Copper Development Association has issued a booklet entitled **"Copper in Chemical Plant."***

*Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.

Calendar of Coming Events

SHOWS

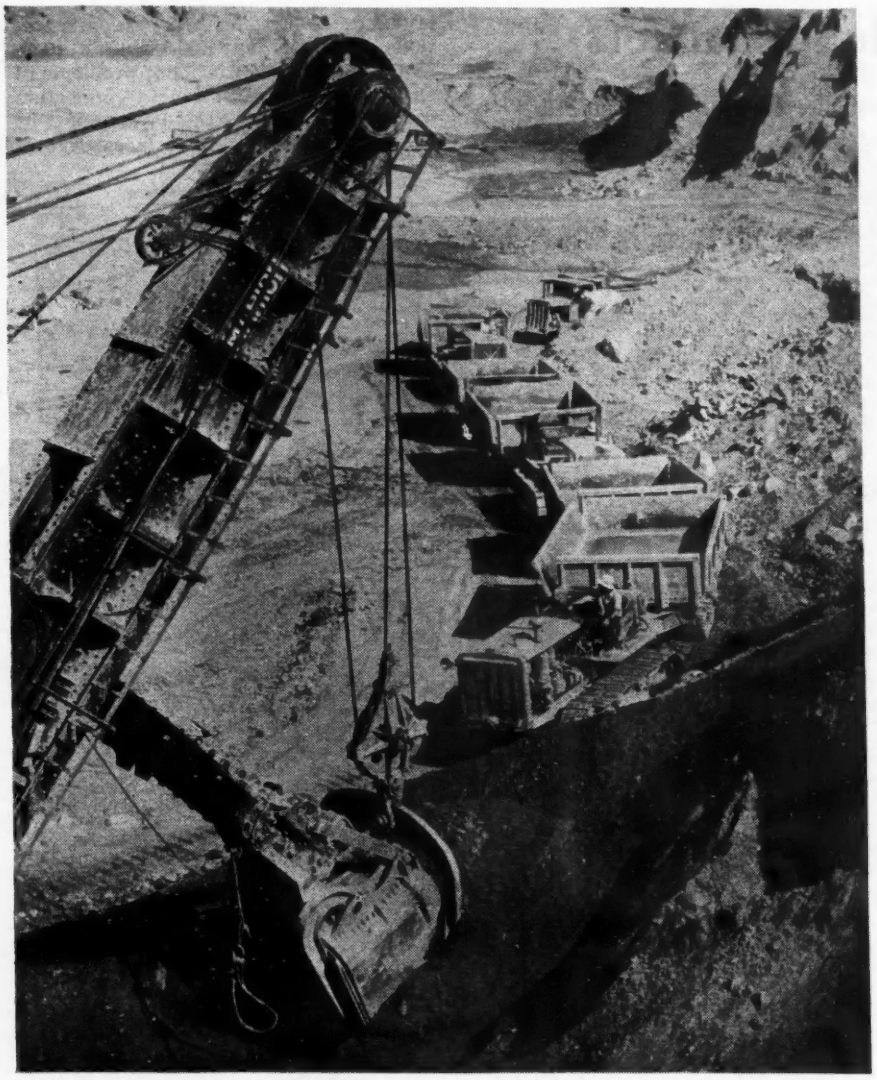
National Motor Boat Show, New York, Jan. 8-16
First International Consumers' Petroleum Exposition, Detroit.....Jan. 16-24
Automobile Show, Berlin, Germany, Feb. 20-March 7
Hungary, International Automobile, Motorcycle and Motorboat Exposition, Budapest .....March
Austria, Automobile and Motorcycle Salon, Vienna .....March 7-13
Switzerland, 14th International Exposition, Automobiles, Motorcycles and Bicycles, Geneca .....March 12-21
Portugal, 11th Automobile Salon, Porto March 27-April 5
Illinois Automotive Ass'n, 4th Annual Show and Maintenance Exhibit, Navy Pier, Chicago .....Apr. 24-28
Poland, Automobile Salon—16th International Fair, Poznan .....May 1-10
Norway, Automobile Salon, Oslo..May 7-10
Second Annual Automotive Maintenance Show, San Francisco..May 20-23
Belgium, First International Aeronautical Salon, Brussels ....June 18-30
Fourth ASTM Exhibit of Testing Apparatus and Related Equipment, New York .....June 28-July 2
Poland, Automobile Salon (Foire Orientale), Lwów .....Sept. 1-15
France, 31st International Automobile Salon, Paris .....Oct. 1-17
Great Britain, 31st International Automobile Exposition, London..Oct. 14-23
National Automobile Show, New York, Oct. 27-Nov. 3
Italy, 10th International Automobile Salon, Milan .....Oct. 28-Nov. 8
Great Britain, 13th International Commercial Automobile Exposition (trucks and buses), London..Nov. 4-13
Great Britain, 36th Scottish International Automobile Exposition, Glasgow .....Nov. 12-20

CONVENTIONS AND MEETINGS

S.A.E. Annual Meeting, Detroit, Mich., Jan. 11-15
American Road Builders Association, Highway Exhibit and Convention, New Orleans .....Jan. 11-15
Tin Can Tourists' Winter Convention, Clearwater, Fla. .....Jan. 29-Feb. 8
Tin Can Tourists' Winter Convention, Sarasota, Fla. .....Feb. 8-14
Association of Highway Officials of No. Atlantic States, 13th Annual Convention, New York .....Feb. 24-26
American Society for Testing Materials, 1937 Regional Meeting and Committee Week, Palmer House, Chicago, March 1-5
International Association for Testing Materials, Second International Congress, London, England.April 19-24
41st Annual Convention and Exposition of the American Foundrymen's Association, Milwaukee .....May 3-7
American Petroleum Institute, Mid-Year Meeting, Colorado Springs, Colo. .....June 1-3
Second World Petroleum Congress, Paris, France .....June 14-19
Automotive Engine Rebuilders Association, 15th Annual Convention, Chicago .....June 21-24
American Society for Testing Materials, 40th Annual Meeting, New York, June 28-July 2

CONTESTS

Indianapolis Speedway, 500-Mile International Sweepstakes .....May 31
Pan American Cup Race, Roosevelt Raceway .....July 5
Roosevelt Raceway, 400-Mile George Vanderbilt Cup Sweepstakes....Sept. 6
Los Angeles, 500-Mile International Sweepstakes .....Nov. 28



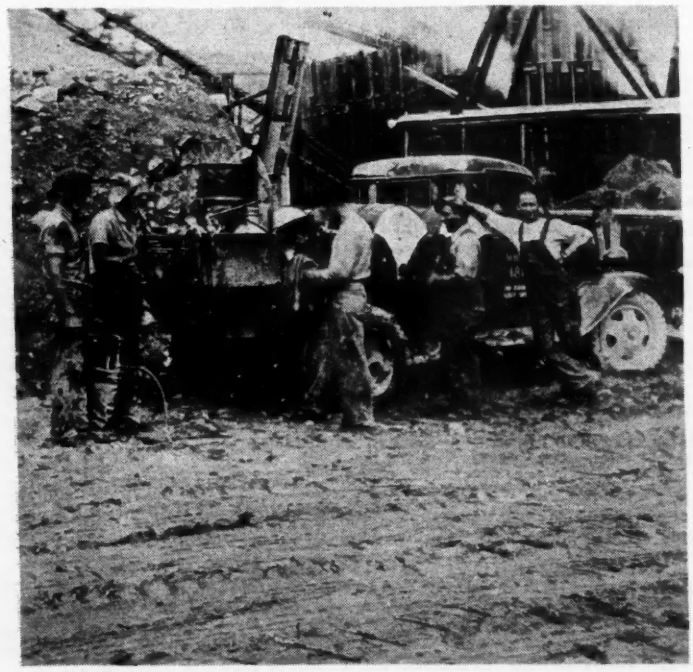
CONSTRUCTION of Grand Coulee Dam in north central Washington has called for the greatest assemblage of heavy equipment ever brought together on a single construction job. With it the builders are "mortising" into the granite hillsides on opposite banks of the Columbia River a concrete structure that will be 4300 ft. long, 500 ft. thick at the base and 550 ft. above lowest bed rock. It will contain 11,200,000 cu. yd. of concrete, being almost three times as large as Boulder Dam.

When the work is done over 5,000,000 useful acre-feet of water will be impounded. Eventually this will turn turbines of 150,000 hp. each, generating power to the amazing total of 1,890,000 kw. A large block of this power will then be utilized to pump water from the reservoir 280 ft. up over the crest of the hills and into the Grand Coulee, ancient bed of the Columbia River. Here a stabilizing reservoir will be created, 23 mi. long, 2 to 5 mi. wide and 70 ft. deep. From this, through canals, the water will be conducted

MOTORS

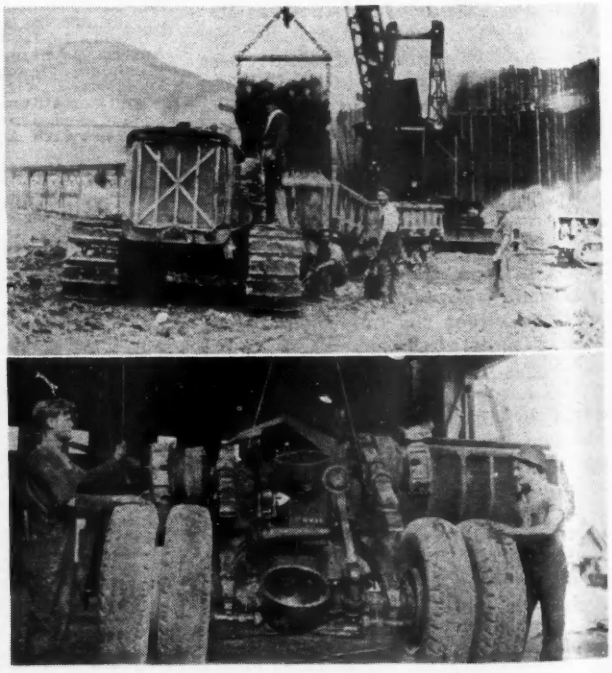
Above. **Work like this was fun after the muck deeper down in the hole.**

Below. **Lubricating truck with crew of six men. This is a Chevrolet pick-up.**



Below (top). **A crew of grease monkeys takes but a few minutes to give a bulldozer a thorough lubrication.**

Below (bottom). **An extensive repair on a rear end. The whole unit is pulled and a spare put in its place. The pulled unit is then repaired and becomes a spare.**



MOVE MOUNTAINS

How 117 pieces of automotive equipment at the Grand Coulee Dam site assist in the tremendous job of "moving a mountain a mile" and wedging a three-quarter mile slab of concrete between two hills is described from the field.

By HENRY W. YOUNG

southward, skirting the famous Dry Falls and eventually spreading outward in a network of canals over 1,200,000 now semi-arid but highly fertile acres of central Washington. In its entirety, this represents possibly a 50-year program. It has now been on its way something over two years.

In order to place the dam in the gorge, it was necessary to remove 15,000,000 cu. yd. of earth and rock. A large percentage of this has been accomplished by steam shovels, trucks and tractor-drawn buggies, feeding the greatest belt conveyor systems ever built. With the passing of this phase of the work, the number of trucks in use has apparently not diminished. New kinds of work are constantly appearing.

Maintenance work is divided among departments, each under a competent foreman. These are: heavy truck and caterpillar shop; general machine shop; welding shop; pick-up truck maintenance and service shop, including tire repair and steam cleaning departments; automotive electrical department; oil house.

In all, there are 117 pieces of automotive equipment, exclusive of 13 company-owned passenger cars, which Mr. Devine, master mechanic for the contractor, the Mason - Walsh - Atkinson Kier Co., enumerated as follows:

10 White 5-A trucks with 12 cu. yd. dump bodies
15 Mack trucks with 12 cu. yd. dump bodies
3 Linn truck tractors with 10 cu. yd. capacity
23 Caterpillar 75 Diesels
3 A.C. 75's
2 Caterpillar 40 Diesels
16 Athey buggies, 12 cu. yd. capacity
6 Woo.ridge buggies, 25 cu. yd. capacity
22 International pick-ups, ½ to 4-ton
9 Chevrolet pick-ups, ½ to 1½-ton
4 Dodge pick-ups, ½ to 2-ton
2 Ford pick-ups, ½ and 2-ton
1 White 2-ton
1 GMC converted to well drilling rig

"Operating conditions on this as on other construction jobs of similar character are hard on truck equipment," Mr. Devine said. "First, the pull is almost invariably uphill in compound gears. The loads are heavy, and in coffer dam excavation much of the time the pull is through mud. Trucks bog down and must be pulled out with bulldozers. In rock, the impact of the shovel loads is terrific. We use shovels on this job with dippers up to 5 cu. yd. Some of the dragline scrapers are even larger. When one of these excavators disgorges onto a truck, the latter has got to be able to 'take it' in more ways than one."

In the truck and Caterpillar shop, the question of truck design in general was discussed with Foreman Mort Lederer. It developed that this company does not order trucks of special design, preferring to revamp the standard types in its own shops which are completely equipped for the purpose. They even go so far as to revamp their own motors and transmission and rear-end assemblies.

Here are some of the changes made to adapt standard equipment to the conditions. Front axles are raised 3 in. The load had been too much to the front, causing axle breakage. Raising the front even that small amount gave better distribution and remedied the trouble.

Greater capacity in bodies is desired in the dump trucks. The welding department is called upon to weld two or three rows of 3-in. pipe, one above another, around the top edge of the body. This is light and strong and adds many cubic feet capacity.

The air tanks were subjected to too much vibration on the frame and were taken off and mounted on the running board. In the case of the radiator shells of the White trucks, the trouble was not vibration but bouncing rocks which cracked the cast shells. This was remedied at a considerable saving over new shells by fabricating shells out of sheet steel in the welding shop.

Springs develop some bugs in service like this. Extra leaves were added, five in the rear and two in front. Frames are also reinforced with more metal at points of greatest stress.

The Caterpillars, rugged as they are when they come from the factory, need some doctoring. When a Caterpillar, as I saw one, is backed 10 ft. up a 30 or 40 deg. incline on a rough, rocky ledge so as to get a running start to dislodge a rock below weighing many

(Turn to page 62, please)

Below. **A view of the east side excavation showing how a train of five of the 12 cu. yd. Athey buggies drawn by Caterpillars served one steam shovel. Three Caterpillar bulldozers were kept busy straightening up capsized buggies and lending a hand at towing when a load got stalled.**

Plymouths coming off the final assembly line at the rate of three a minute

Production Lines

Super Flux

Just a note concerning the fact that Continental Motors, among other things, has an excellent set-up for manufacturing a line of magnetic loud speakers. A unique feature of the unit is the use of the small but tremendously powerful magnet of Alnico, a novel metallurgical composition containing aluminum, a high percentage of nickel, and other ingredients. The magnets are cast in a special foundry set-up at Continental.

Improved Machine

At a recent meeting of the Independent Committee on cutting fluids, we were told that some important changes have been made in the Timken lube testing machine which permit excellent correlation between the machine and road test. This should be of great interest to research men in connection with E-P lube development. It is quite possible that an effort may be made to use this equipment for correlation tests on cutting fluids.

Machinability

In many quarters, the term machinability is a regular topic of conversation. Attempts have been made to define this term on a scientific basis but that's no simple matter. In fact, any attempt at simplification may result in dangerous generalization. A number of attempts have been made recently to provide a practical rating of materials according to the ease with which they may be cut. Several valuable tables along this line have originated with the larger steel producers. What we want to stress is that the rating of materials varies with many factors, namely, the condition in which the specific alloy is used, the type of machining operation, the type of cutting fluid employed, etc. A comprehensive study along this line was initiated recently by the Independent Research Committee on cutting fluids of which we are chairman.

Amtorg Buys

In the plant of one large machinery manufacturer we were shown some new high production machines being erected for shipment to the U. S. S. R. This is a battery of huge cam-and-crank boring machines—and it is intended for Diesel engine production for tractor use. We personally know of few places in this country where the volume of Diesels could possibly justify a battery of these special machines. So the U. S. S. R. must be set on a pretty big program.

Industrial Medicine

There is a growing conviction that metal working plants must give a lot of thought to worker-comfort and safety measures so as to anticipate the flood of ill-advised legislation that's bound to come very soon. We say "ill-advised" only because the subject is new and very little is really known about occupational hazards and their elimination. In fact, there is currently developing a new science of industrial medicine. And the Harvard school already is producing some men with special training in this specialty. All this leads up to the fact that several important organizations in the automobile industry have started a preliminary survey of safety and occupational hazards through the medium of several of the specialists we have mentioned.

Send Experts

Only the master mechanics know the grief that attends the installation of a new line of production equipment. And in many cases the experienced shop executive allows himself plenty of time to run in the new line before starting production. One of the machinery sales managers who knows his stuff makes the suggestion—which we heartily second—that the smart thing to do is to send one of your good tool men to supervise the final erection and running-in of the more complicated automatic tools. A good man on the job can save most of the grief that usually comes up after the machine has been set up to run in your plant.

Second Largest

According to the *Copper & Brass Bulletin*, the automotive industry is the second largest consumer of copper and its alloys. This came as a surprise to us, even though we are accustomed to believing that the industry is just about the largest consumer of any kind of raw material known to the art. It is of great interest to note that for the past 10 years the average amount of copper and its alloys used per car has been around 45 lb. It is estimated that for 1937, based on a five-million-car production, the industry will use the staggering total of 225,000,000 lb. of these materials.

—J. G.

Available publications sometimes mentioned on this page will henceforth be found regularly under "Publications Available." See page 45 in this issue.

MANUFACTURING MANAGEMENT METALLURGY

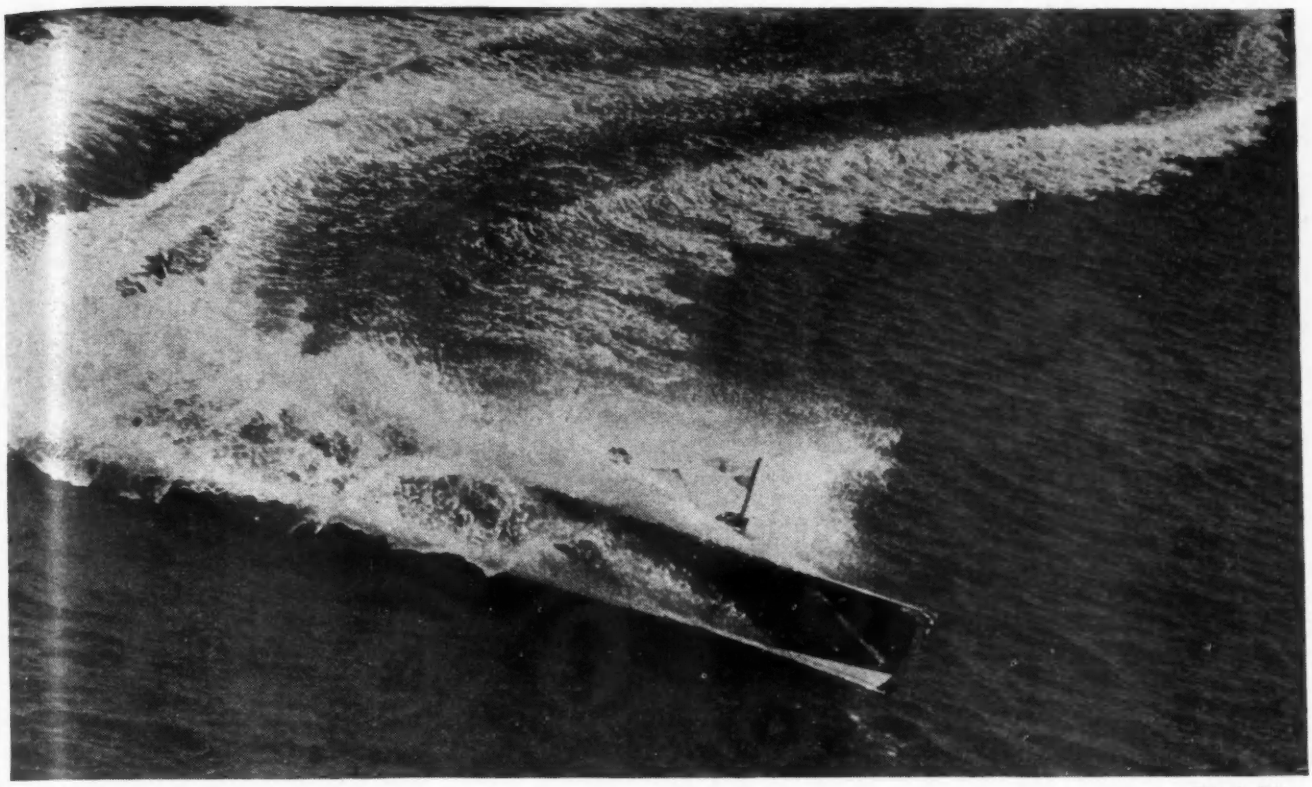


Photo by Rittase

1937 Brings

More Power for Motor Boats

Three floors of display at Annual New York Show

THREE floors of Grand Central Palace, New York, are occupied with exhibits of boats, engines, accessories and equipment of motor-propelled water craft in the thirty-second annual show which opened under the auspices of the National Association of Engine and Boat Manufacturers on Jan. 8, for a run of 8 days. Boat exhibits range from small outboard runabouts to sea-going motor yachts, and include utility craft, family cruisers, fishing boats for sportsmen, power tenders and sail boats. In addition, novelty craft, kyaks and canoes are on display. There is a noticeable increase in the number of outboard boats, particularly of the runabout type, which achieved great popularity some years ago. There appears to be a tendency toward slightly larger sizes in cruisers and utility boats, and stress is being laid by exhibitors on after cockpit arrangements for fishing. More than 160 exhibitors, from all parts of the country, are participating.

A greater range of models than ever before is being offered the sea-going motorist this year. There is also a tendency to include more equipment in the list price than has been customary in the past. In the engine division there are quite a number of new designs, and both gasoline and Diesel marine engines are well represented. Here the tendency naturally is to get more power from a given displacement or a given weight. Considerable interest is being shown in outboard engines being offered at record low prices, and in marine generating sets of little greater capacity than that of automobile generators.

There is, of course, considerable that is new in the accessories and equipment section. Marine radio telephones, streamlined fittings, fishing chairs, log books, lubricant guns, paints, metal finishes, spark plugs, battery testers, forced-draft blowers and anti-fouling compounds are among the exhibits that hold the interest of the visitors. In the following the principal engine and marine generating-set exhibits are briefly described.

Buda-Lanova

Buda-Lanova Diesel-type marine engines are being exhibited by the Buda Co., Harvey, Ill. These are in the main identical with the Buda Lanova automotive engines which have been fully described in AUTOMOTIVE INDUSTRIES, but adapted for marine work by being provided with a reverse gear and other equipment essential in marine service. A photograph of the four-cylinder marine set is reproduced on the next page.

Chris-Craft

Chris-Craft shows a line of engines consisting of 45- and 55-hp. four-cylinder models, 85, 95, 110, 125, and 130-hp. sixes and 250 and 375-hp. V-eights. All models have Silchrome steel exhaust valves, aluminum pistons, new cylinder heads and (with the exception of the V-8s) tension-type rubber engine mountings. Reverse gears are of the high-ratio type, with anti-friction bearings and with pressure lubrication from the end of the gear shaft. Although built integral with the engine, they can be easily removed. The thrust bearing is built in, and the gear has self-adjusting oil seals at both ends.

All Fours and Sixes have up-draft marine carburetors of the safety non-drip type, with flame arresters. Crankcase ventilators remove dangerous vapors from the bilge. Diaphragm-type fuel pumps are installed.

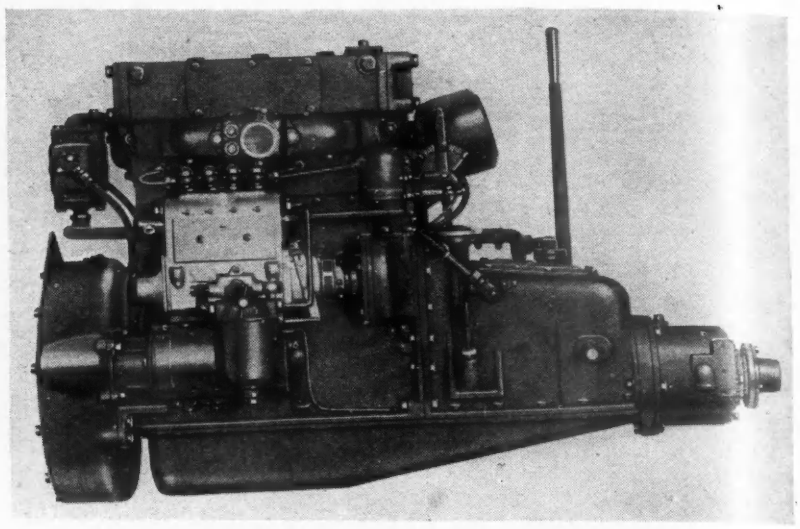
The two four-cylinder engines are rated 45 hp. at 3000 r.p.m. (Model C) and 55 hp. at 3200 r.p.m. (Model B). Both have a bore and stroke of 3¼ by 4 in., making the displacement 132.7 cu. in. Model C is said to be particularly suitable for trolling and for use in small fishing boats, where a low idling speed is desirable. Model B differs from Model C in having a different cylinder head, carburetion and manifolding. This model may be had with a reduction gear. Both engines are of the L-head type and weigh 450 lb. without the reduction gear.

Six-cylinder L-head engines with seven-bearing crankshafts are available as Models K, KA, L, LA, and M. They have tubular bronze oil coolers and the cooled oil is delivered directly to the main bearings instead of to the crankcase. With the exception of the KA and LA these engines are available in opposite rotation with 2:1 reduction gear lubricated by oil from the engine. There are special supporting arms at the rear end of the reduction gear which fasten to the keelsons. Model K, which has a bore and stroke of 3⅜ by 4⅛ in. (221.4 cu. in. displacement) is rated 85 hp. Gear-type water pumps with herringbone gears are used on all fours and sixes. Model L, which has a bore and stroke of 3⅝ by 4¼ in. and a displacement of 263.2 cu. in., is rated 110 hp. at 3200 r.p.m. Model M, with a bore and stroke of 4 by 4¼ in. and a displacement of 320.4 cu. in., is rated 130 hp. at 3000 r.p.m.

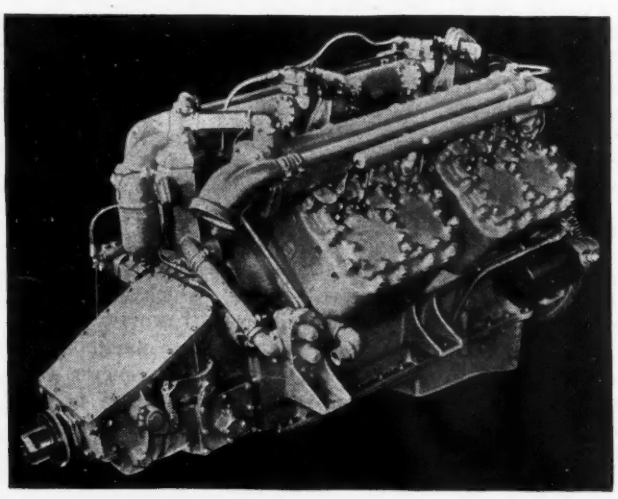
Overflow pipes are incorporated in the manifold, which makes for neatness of appearance and prevents collapse of the pipes and closing of the water outlet. All timing gears are metallic, those on the distributor and crankshaft being of tempered steel, while the camshaft gear is of softer steel.

The A-120 V-8 engine, which was first built in 1928, has been redesigned and is now rated 275 hp. at 2200 r.p.m. It has pair-cast cylinders of 5 in. bore and 4¼-in. stroke, making its displacement 824.7 cu. in. Its three-bearing crankshaft has pressure lubrication. The standard direction of rotation calls for swinging the wheel right-handedly, but for twin-screw installations the engine is available also in the opposite direction of rotation.

In addition to the standard models Chris-Craft will build three high-speed engines for use in fast runabouts and commuters, viz., the Model KA having 221.4 cu. in. displacement and rated 95 hp. at 3550 r.p.m., the model LA having 236.2 cu. in. displacement and rated 125 hp. at 3500 r.p.m., and the Model A-120-A, with 845.4 cu. in. displacement and rated 375 hp. at 2800 r.p.m.



Diesel-type marine engines are shown by Buda Co. Here is shown a four-cylinder model.



This Chris-Craft engine is a V-8 with a rating of 375 hp.

Chrysler

A new Crown six-cylinder engine features the Chrysler marine-engine line for 1937. Two of the models of the line, the Ace and the Royal Eight, develop more power than in the past. There are four models, the Majestic Eight completing the line. All four are offered for both directions of rotation, and in straight-drive as well as in reduction-gear types.

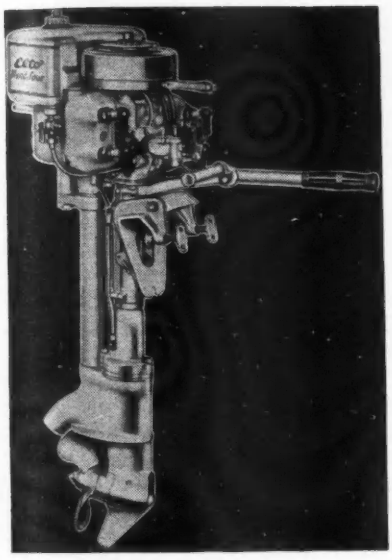
Bore, stroke and displacement of the new Crown engine are the same as in the 1936 model, but the power output has been increased by enlarging and improving the inlet and exhaust valves and passages. Owing to the provision of more water space between the cylinders the cylinder block is slightly longer than formerly.

The Ace, the smallest of the Sixes, has a bore and stroke of 3⅛ by 4⅜ in.

and a displacement of 201 cu. in. It is rated 43 hp. at 1600 and 75 hp. at 3200 r.p.m., and in addition to being supplied as a straight-drive powerplant it can be fitted with a 2:1 or 2.5:1 reduction gear. The Crown, the larger of the Sixes, has a bore and stroke of 3⅜ by 4½ in. and a displacement of 241.6 cu. in. It is rated 54 hp. at 1600 and 97 hp. at 3200 r.p.m. and it, too, can be supplied with a reduction gear of either 2:1 or 2.5:1 ratio.

The Royal Eight, the smaller of the two Eights, has a bore and stroke of 3¼ by 4⅞ in. and a displacement of 323.5 cu. in. It is rated 70 hp. at 1600 and 120 hp. at 3200 r.p.m. and can be fitted with reduction gears of 2:1 or 2.5:1 ratio. The Majestic, the larger of the two Eights, has a bore and stroke of 3½ by 5 in. and a displacement of 385 cu. in. It is rated 97 hp. at 1600 and 152 hp. at 3200 r.p.m. This model also can be fitted with a reduction gear of either 2:1 or 2.5:1 ratio.

When equipped with reduction gear the rating of the various models is slightly lower.



The Elto Handifour

Elto

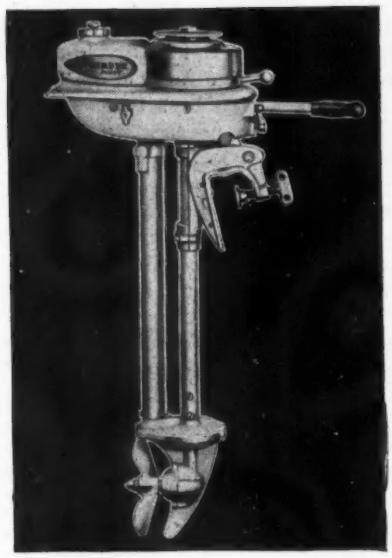
The 1937 Elto line of Evinrude Motors includes a new small outboard model known as the "Pal" which weighs only 15 lb. and sells at $34.50. Its horse power (0.9 N.O.A. at 3500 r.p.m.) is about equal to that of the earliest outboards, but it weighs only one-fourth as much. The Pal has built-in flywheel magneto ignition, lever-type mixture control, a combination float-feed check-valve carburetor, sealed under-water exhaust, free tilt, and a two-stage centrifugal water pump. This engine is said to give small boats a speed of up to 6 m.p.h.

This year for the first time the Elto line includes also a four-cylinder model, the Handifour rated 9.2 N.O.A. hp. at 4000 r.p.m., which sells at $150. It has magneto-flywheel ignition, rotary valve construction, a float-feed carburetor with silencer and a two-stage centrifugal pump. Other features include a heat-treated, streamlined aluminum gear housing, a rubber-mounted Co-pilot with vibrationless steering handle, and automatic exhaust cutout.

The Elto Ace, introduced last year, is continued. There are also three Elto twin models, the Handitwin rated 2.5 hp. at 3500 r.p.m., the Service twin rated 4.3 hp. at 3500 r.p.m., and the Speeditwin rated 22.5 hp. at 4000 r.p.m.

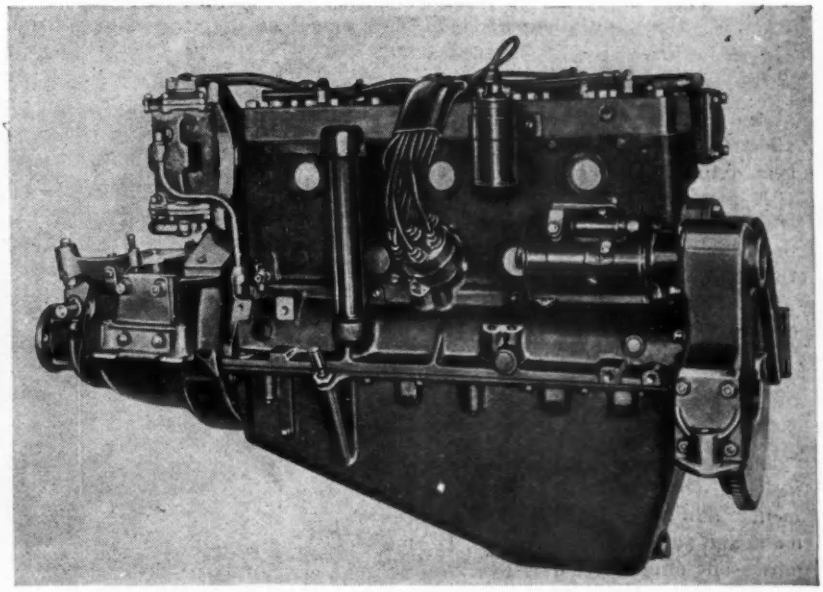
Evinrude

Evinrude Motors of Milwaukee features a new Scout outboard engine which weighs complete only 16 lb. and sells for $44, said to be a record low price in the history of the company. The power-head enclosures of Evinrude engines now have flowing contours into which the fuel tanks used on the smaller models blend. The engines are now provided with a two-stage centrifugal water pump housed within the anti-cavitation plate above the propeller, the twin impellers of the pump being integral with the drive shaft. Hoods on the engines shield them from spray and protect the operator from contact with wires and engine parts. A new feature this year is an improved two-piece grease seal that is automatically tightened by a steel ring with presses on two circular cork wedges.



This outboard motor is the Evinrude Scout and weighs 16 lb.

The new Scout engine has a rating of 0.9 N.O.A. Certified B.H.P. at 3500 r.p.m. It can be stowed in a space measuring 31 by 12 by 7 in. The carburetor is the same as that on the Sportsman model, ignition is by an



The new Crown six-cylinder engine a feature at the Chrysler exhibit

Evinrude magneto. The engine can be stowed in a smooth metal container that fits under the "pullman" seat or in an automobile trunk. An auxiliary fuel can is included in the price of this container.

A number of changes have been made in the Sportsman, which is now rated 1.6 hp. at 3500 r.p.m. A new carburetor is said to improve the starting and give better idling and economy. The fuel tank capacity has been increased 50 per cent and now permits of 1½ hours' running under full load.

Three "twins" are included in the line, opposed cylinder engines in which impulses occur simultaneously. There are also three four-cylinder engines in the line. These are, in effect, double alternate-firing engines, two explosions always occurring at the same time. Among these is the Speedifour whose rating has been increased to 33.4 hp. at 4000 r.p.m. The Sportfour and Speedifour may be had with 12-volt electric starters and storage batteries at an extra cost of $50. On the All-Electric outboard outfit the price has been reduced to $59.50.

A new Evinrude product is a pump which can be put in the place of the propeller and serves to pump water for the lawn, garden, cottage or garage. Three Evinrude racing models are also offered.

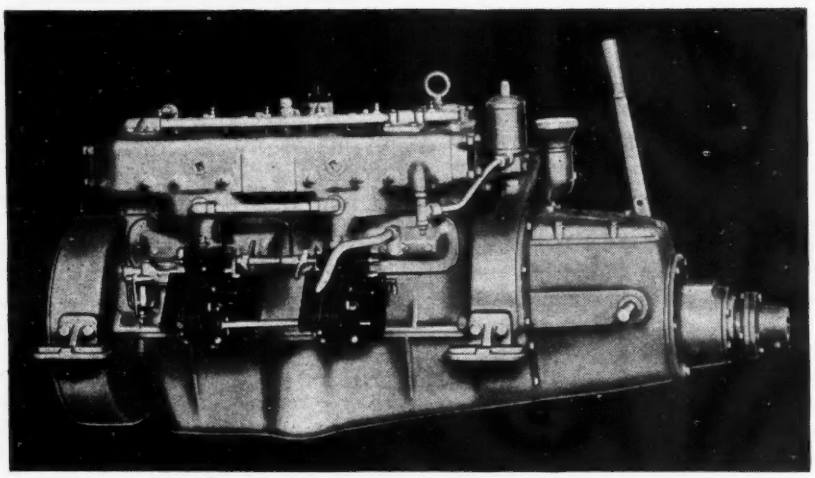
In the four cylinder group there is a new Four-22, which has a piston displacement of 91 cu. in. and is unusually compact, being only 31 in. in overall length. Including the reverse gear it weighs 365 lb. (all iron), and it is claimed to develop 30 hp. at 2600 r.p.m. This is the smallest four having individual porting and manifolding, this feature previously having been reserved for larger engines. Options are offered on 6-volt and 12-volt electrical equipment, magneto ignition, and a 2:1 reduction gear. It is claimed to be materially more economical with respect to fuel consumption than previous small fours.

A new six-cylinder Gray of 170 cu. in. displacement and rated 52 hp. at 2600 r.p.m. is offered at a specially low price. It carries the same equipment as the Six-51 and the Six-71.

Gray lays considerable emphasis on the feature of individual inlet porting, which is found on 20 out of 26 models in the 1937 line. It is claimed to give greater smoothness of operation and more power from the same fuel. All medium- and heavy-duty engines in the line are equipped with "Thermoset," a patented device for controlling the engine temperature, between the limits of 150 and 180 deg. Fahr.

For modern fast cruisers Gray has developed a "speedgear" with a reduction ratio of 1.5:1. It has been found that as boat speeds went up, greater propeller efficiency was obtained at higher propeller speed, and so a reduction gear with smaller reduction ratio was called for.

All Gray engines of 3 in. bore or larger and with less than eight cylinders can be had with double ignition, 6 or 12-volt, which is standard on some and optional on others of these models.



Here is the super-six 117-hp. model of the Gray line

Gray

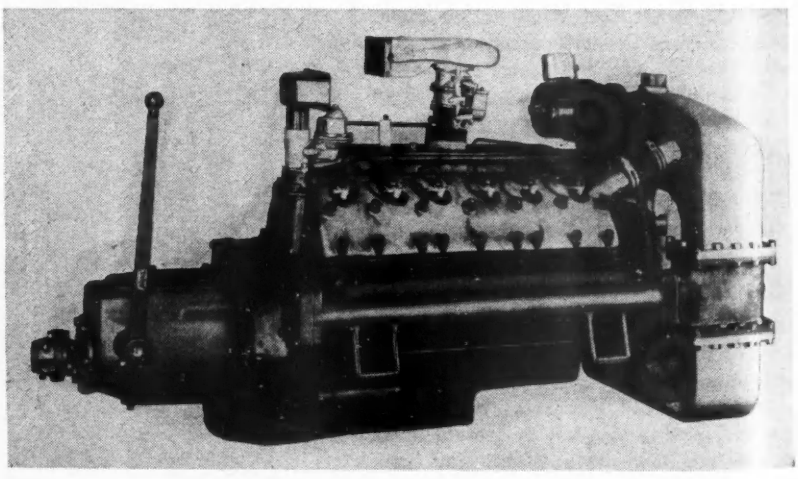
The Gray line for 1937 is basically identical with the 1936 line, but refinements and improvements have been made and several models added. It comprises one single-cylinder, five "fours," ten "sixes" and two "eights," ranging in output from 5 to 160 hp.

Lehman

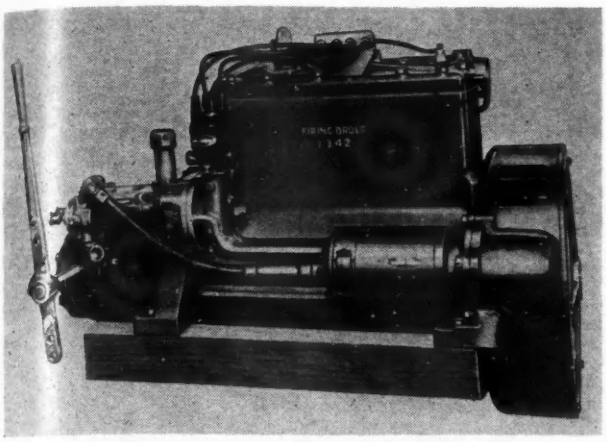
Lehman Marine Engineering Co. displays a self-contained fresh-water cooling system. A pipe line to a scoop at the bottom of the hull takes in salt water; this water does not enter the engine block but merely serves to cool the exhaust lines. Four Harrison heat-transfer units are used in the cooling system and are located inside a bronze housing. The salt water is circulated by means of an Oberdorfer gear pump.

The same company also introduces a small electric generating set which is to be made in 1, 1½, 2, 3, and 5 Kw. sizes and wound for either 110 or 220 volts. The generator is driven by a four-cylinder 2.2 by 3 in. gasoline engine developing 13.5 hp. It has a ball-bearing crankshaft, an automatic choke, and a centrifugal governor. It is claimed that the engine starts instantly at the turn of a key.

Many improvements have been made



1937 Lincoln Zephyr marine engine presented by the Lehman Marine Eng. Co.

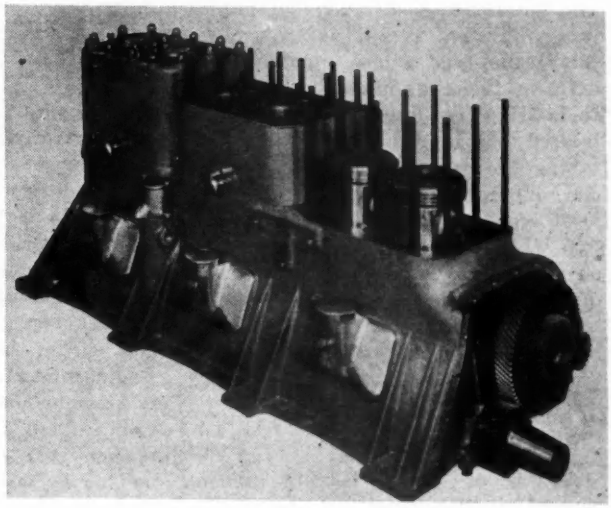


(Left) The Red Wing 4 cylinder "Arrowhead Junior" is rated at 20-40 hp.

are not used, replacement engines may be installed on existing motor beds. Scripps Motor Co. builds marine engines in four- and six-cylinder vertical and in V8 and V12 types, ranging in output from 25 to 300 hp.

Scripps shows a partially assembled six-cylinder engine with twin-cylinder blocks and cylinder heads; also a special exhaust manifold for use in deep-draft auxiliary sailing craft. In Series F-4 and F-6 the oil consumption has been materially reduced by the use of pistons of an improved design and the

in the company's conversion kits. In the Model A conversion the water pump has been lowered and a self-priming feature introduced. The end of the water-pump shaft is supported by a radial ball bearing. The direction of water flow through the Model A engine has been reversed and increased economy is claimed to result. In the V8 conversion units clean-out plates are now provided on the exhaust manifolds so that scale and rust can be removed. A new crankcase breather, ½ in. lower than the previous design and equipped with a Zenith backfire assembly, is now being furnished. The company continues to build racing models of V8 engines.



(Right) A partially assembled Model 206 of the Scripps line. It generates 167 hp.

Red Wing

Red Wing Motor Co., Red Wing, Minn., in addition to its older models, the Arrowhead 25-45 hp. and the Hiawatha 52-85 hp., exhibits its new Arrowhead Junior, which has a 2040 hp. rating. This is a four-cylinder, four-cycle engine of 3¼ by 4-in. bore and stroke (282 cu. in.). Inlets are heated and the exhaust manifold is water-cooled. All main, connecting-rod and camshaft bearings are pressure-lubricated through the drilled crankshaft. The pressure system of lubrication extends even to the piston pins, idler gear and the reverse gear. Features of the lubrication system are a patented oil-level control device, a submerged oil pump, rifle-drilled oil ducts, and a pressure relief valve adjustable from the outside. The oil-level control device prevents the oil lines from becoming air-bound. It makes possible the use of a vertical strainer screen, which is claimed to afford extra filtering surface and keeps the oil cleaner, as sludge cannot adhere to the vertical surfaces.

Provided with a gray iron base the engine weighs approximately 450 lb. and sells at $385. A special lightweight, high-speed type of the same design, with alloy pistons, light reciprocating parts, aluminum base, flywheel cover and reverse-gear housing weighs about 400 lb., is rated 40-55 hp., operates at speeds up to 3200 r.p.m., and sells for $425.

Red Wing Motor Co. also offers Red Wing-Waukesha Comet Diesel marine engines in two six-cylinder designs of 75-100 and 120-140 hp. rating respectively, and Red-Wing-Waukesha-Hesselman four and six-cylinder fuel-oil marine engines. Both types are offered in three sizes, the four-cylinder engines having ratings of 35-40, 55-60, and 80-90 hp. respectively and the six-cylinder engines of 65-75, 160-180 and 180-200 hp. respectively.

Scripps

An innovation in connection with the Scripps line of marine engines is that rubber mountings are now available for all models. These attach directly to the original engine supports of the larger models, so that when mountings

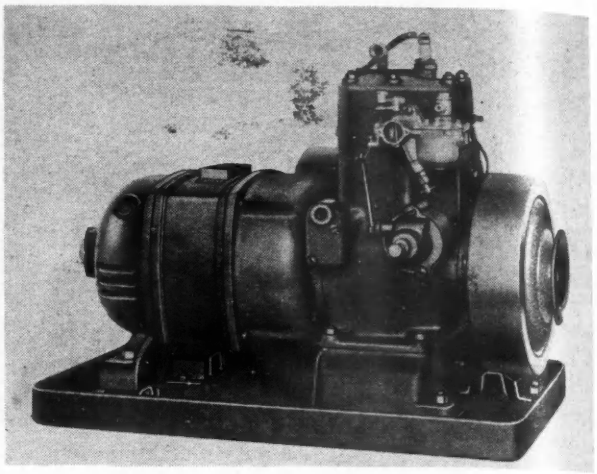
latest type oil-control rings. On these models the reverse gear has been completely redesigned. It incorporates a wide reverse-gear band of semi-steel which is actuated by a toggle clamp. A ball-bearing operating collar takes the thrust of the control linkage. All models of these series are available with rubber mountings, which are an extra on the 150 and 300 Series engines.

New pistons of greater strength, with the new oil-control rings, are among the improvements on Series 160, 170 and 200. These engines are fitted with a new Joe's reverse gear which has a double clutch and is so designed that the gears are relieved of load when the clutch-control lever is in the forward position. A bronze cone clutch in the forward end of the gear assures that the reverse-gear drum is locked to the crankshaft, when the clutch is engaged thus providing a tandem flywheel effect. The reverse-gear drum is now supported on a ball bearing, and a ball-bearing operating collar takes the control-rod thrust. Medium-speed models of these series have new, higher-compression cylinder heads. Suspension-type rubber mountings are optional. The brackets

can be so arranged that all supports may be assembled parallel to the crankshaft or offset.

The new Scripps V12 (Zephyr V12 conversion), which was introduced some time ago, is exhibited for the first time. It is available in four direct-drive and four reduction-gear models. Cast-iron cylinder heads and cast-iron oil pans are being offered as optional equipment.

The Scripps V8 (Ford conversion) is available in four direct-drive and four reduction-gear models. Its reduction gear is of the straight-line, double-reduction, internal-gear type and has a reduction ratio of 2.12:1. The two belt-driven water pumps furnished with this engine are of the reservoir type, inlet and outlet being so arranged that the pumps always retain their priming. Suspension-type rubber mountings are extra on these engines. Exhaust manifolds are so designed that the outlet is located high. Provision is made for taking the exhaust from the forward end of the engine, which makes the most economical exhaust-pipe installation where Vee drives are used. The oil filler is now conveniently located on top of the engine. A crankcase breather tube is provided and engine fumes are taken into the carburetor air intake.



The United States Motor Corp. is showing a line of marine lighting plants.

U. S. Motors

A line of U. S. marine lighting plants, manufactured by the United States Motors Corp. of Oshkosh, Wis., is being exhibited by the firm's eastern agents, the Smith-Meeker Engineering Co. The line includes sets of 200, 350, 500, 800, 1000, 1500, 3000, 5000, and 7500 watt output. Some of the smaller engines are air-cooled while the larger ones are water-cooled. The company also has Diesel-engine electric plants of 3 Kw. and 5 Kw. output, and larger units up to 63 Kw. The 3-Kw. unit comprises a single-cylinder vertical engine of 3⅞-in. bore by 5¼-in. stroke, developing 6 hp. at 1200 r.p.m., while the 5 Kw. unit has a single-cylinder engine of 5-in. bore by 6½-in. stroke, developing 10 hp. at 1000 r.p.m. Cooling is by a radiator with ball-bearing fan. These engines burn fuel oil of between 24 and 38 deg. Baume and clean, free-flowing fuel oil is recommended.

A feature of all U. S. water-cooled marine generating sets is the rubber mounting, which prevents engine vibration from being transmitted throughout the boat. These units, moreover, are specially designed for marine service and comprise a bronze circulating pump with herringbone gears, except on the single-cylinder unit.

The smallest and lowest-priced set of the line is an air-cooled unit known as the "Firefly." It comprises a single-cylinder air-cooled engine of 1¾-in. bore by 1⅞-in. stroke which is rated ½ hp. at 2000 r.p.m. The crankshaft is mounted on ball bearings, the engine has high-tension ignition and a foot starter, and it comes with a built-in fuel tank. The generator of this set is wound for either 6 or 12 volts and has an output of 200 watts. It is of the d.c. type and therefore suitable for battery charging. This set is claimed to run 18 to 20 hrs. on one gal. of gasoline. The battery required for use with this outfit is the conventional automobile battery.

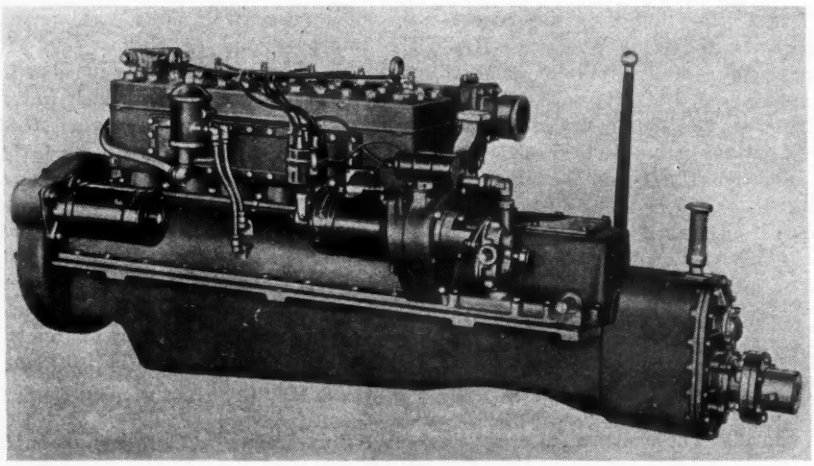
Universal

Universal Motor Company shows two new new Cruiser Sixes, both of 90 hp. One is a direct-drive unit, the other a reduction-gear model, and both are designed especially as repowering units. The addition of these two new Sixes brings the number of Universal marine engines up to 42. The line includes engines with from one to eight cylinders.

With a bore of 3½ in. and stroke of 4½ in. the new Model HCS has 260 cu. in. displacement. It is 4 in. shorter, 100 lb. lighter, and 40 per cent more powerful than the previous Universal Cruiser Six.

Among the features of the new engine are helical-cut timing gears, a gear-type oil pump located in the deepest part of the oil base and positively driven from main timing gear train; a 12-volt starting and ignition system, a split crankcase, and a removable cylinder block.

The direct-drive model develops its 90 hp. at 3000 r.p.m. of the propeller shaft, while the reduction-drive model delivers this same power at 1300 r.p.m.

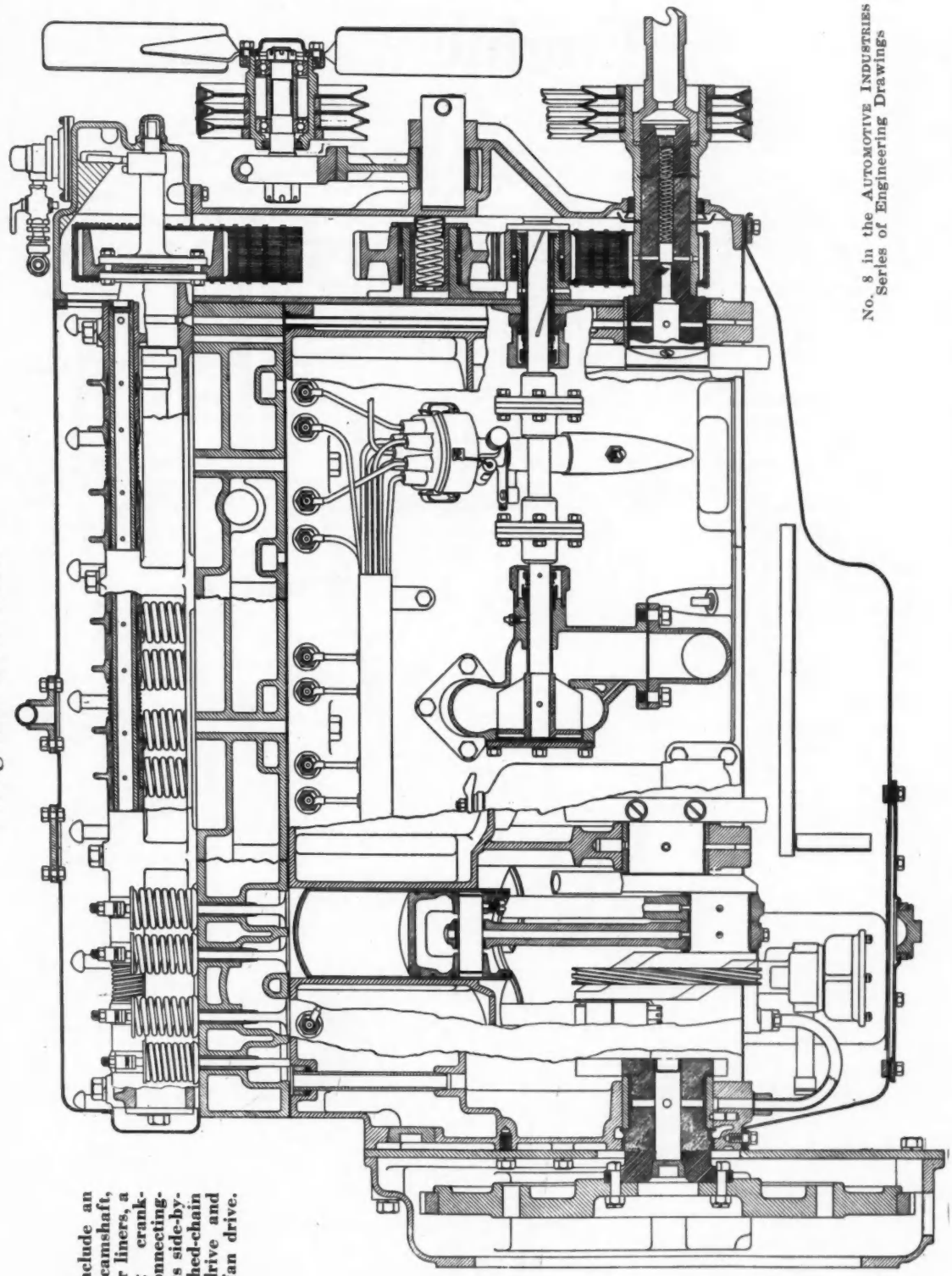


This new Universal Cruiser Six engine is 90 hp. model.

Next week's issue of AUTOMOTIVE INDUSTRIES will describe additional marine engines exhibited at the National Motor Boat Show in New York.

American LaFrance 12-Cylinder Engine

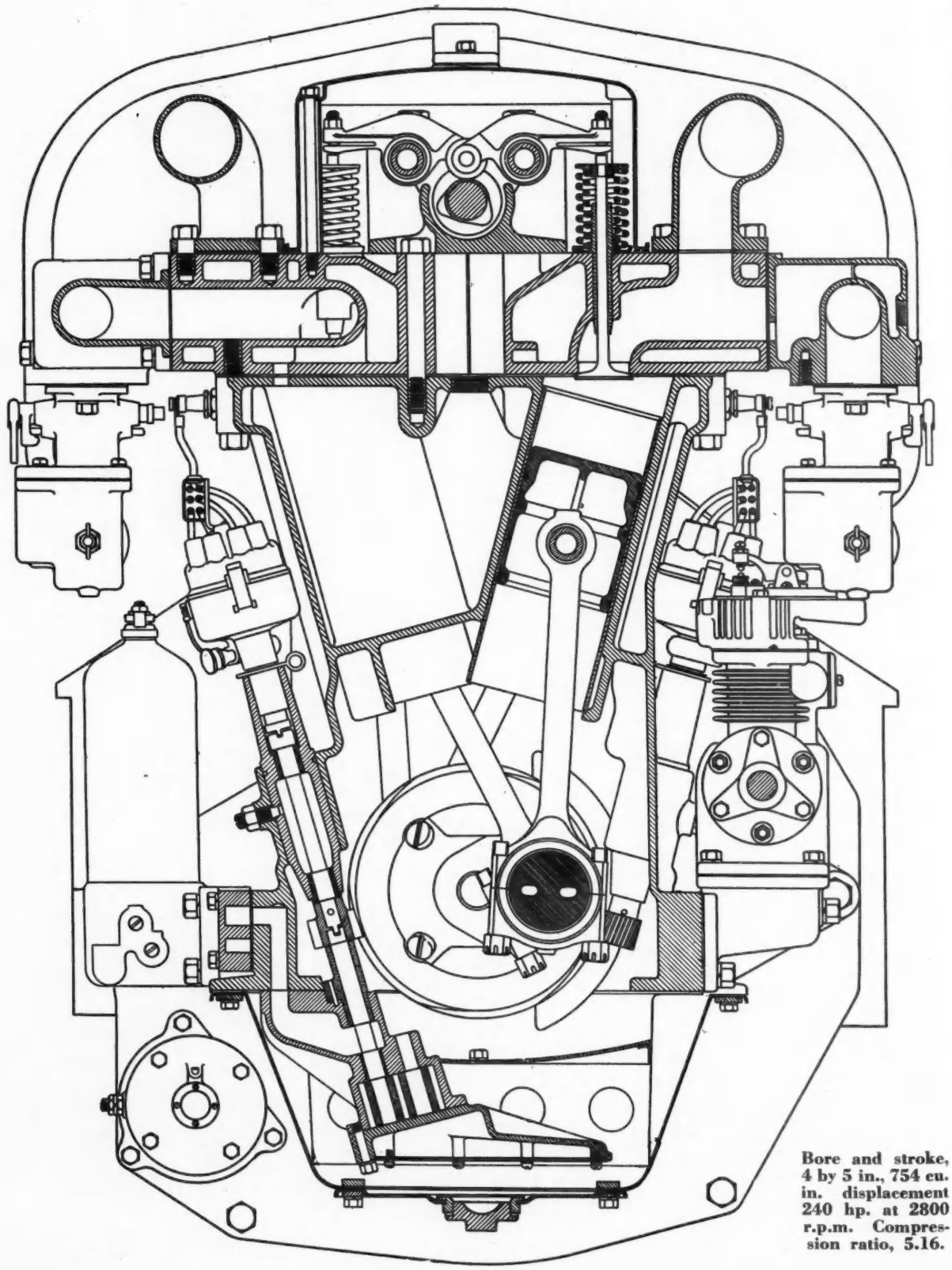
Longitudinal Section



Features include an overhead camshaft, dry cylinder liners, a five-bearing crankshaft, connecting-rod bearings side-by-side, toothed-chain camshaft drive and triple-belt fan drive.

No. 8 in the AUTOMOTIVE INDUSTRIES Series of Engineering Drawings

American LaFrance 12-Cylinder Engine Transverse Section



Bore and stroke, 4 by 5 in., 754 cu. in. displacement 240 hp. at 2800 r.p.m. Compression ratio, 5.16.

New DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

New Developments Received

Descriptions of the following new products will appear in forthcoming issues of AUTOMOTIVE INDUSTRIES, space permitting. If you desire immediate detailed information on this equipment, we suggest that you consult the manufacturer.

Riveter, electric-hydraulic. Hanna Engineering Works, Chicago.

Molding machine, full hydraulic plastic injection. Reed-Prentice Corp., Worcester, Mass.

Grinding machines, 14 in. and 16 in. plain self-contained cylindrical. Cincinnati Milling Machine and Cincinnati Grinders, Inc., Cincinnati, Ohio.

Turret lathe (capacity of 1⅝ in. round bar with 9½ in. turret travel and 16½ in. swing over ways). Millholland Sales and Machine Co., Indianapolis, Ind.

Milling attachment, high speed universal. Cincinnati Milling Machine and Cincinnati Grinders, Inc., Cincinnati, Ohio.

Gear finishing machine, two-cutter, crossed axis rotary. Michigan Tool Co., Detroit.

Exhaust gas analyzer. Permutit Co., New York.

Miller, universal vertical. W. B. Knight Machinery Co., St. Louis, Mo.

Automatic Lathe

New Center Drive Attachment For J & L 20 In. Machine

The Jones & Lamson Machine Co., Springfield, Vt., has announced a new center drive attachment for the 20 in. J & L Fay automatic lathe which makes possible the simultaneous turning of both ends of long, heavy shafts and similar pieces.

The machine illustrated is used for turning, facing and forming both ends of a truck rear-axle housing simultaneously. The photograph shows the set-up for the first operation on this piece. The housing is driven by a fixture mounted on the center drive attachment which engages the banjo portion of the housing. Adjustable bearings are provided in this fixture for supporting the housing as well as for driving it.

For the second operation, the housing is held on both sides of the attachment by fixtures which grip on the round portion of the housing close to the flange.

The carriage tool carrying members are mounted on separate center bars which are controlled by cams so that both carriages feed toward the center of the machine, additional cam space being provided for the tail-stock center bar by an extra cam drum attached to the end of the bed. The front former slides are also arranged to travel in opposite directions so that proper relief may be obtained by the turning tools at the end of their cut.

Each carriage carries eight turning tools and two chamfering tools, and each back arm carries five facing tools and one chamfering tool. By using a spindle speed of 67 r.p.m., a floor to floor time of four min. and five sec. per housing is said to be obtained.

Boring Machine

Baush Center-Feed Principle Used With Hydraulic Feed Cylinder

A deep hole boring machine has been announced by the Baush Machine Tool Co., Springfield, Mass. The Baush center-feed principle is incorporated with the hydraulic feed cylinder. Accurate alignment between the hyraulic cylinder head and the take-up bushing is maintained by adjusting taper gibs on front and side of the T-ways.

Accuracy of the boring operation is said to be attained with the four special catspaws in the boring bar tube. These catspaws are non-revolving, expansible and contracting supports, located just back of the cutting tool. They automatically expand against the freshly cut wall of the bore while the tool is still close to the bushing. These supports, sliding down the bore, give the single flycutter a rigid support. Hence, as the manufacturer states, the catspaws allow a wider face tool than used hitherto on long bores. The wide face tool allows moderate cutting speed without losing high production.

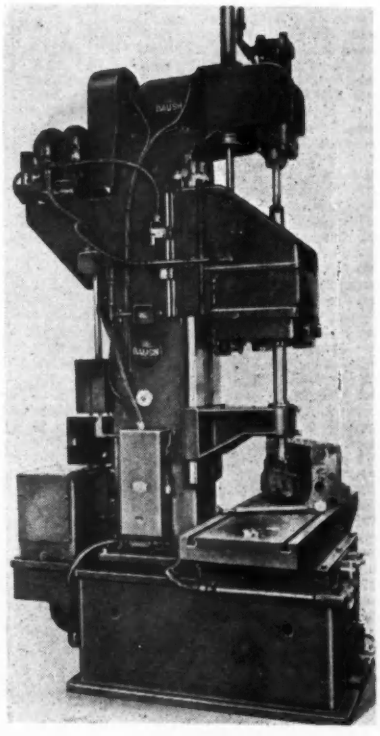
Die Spotting Press

Bed Has 5 T-Slots For Clamping And Area Of 160 In. By 140 In.

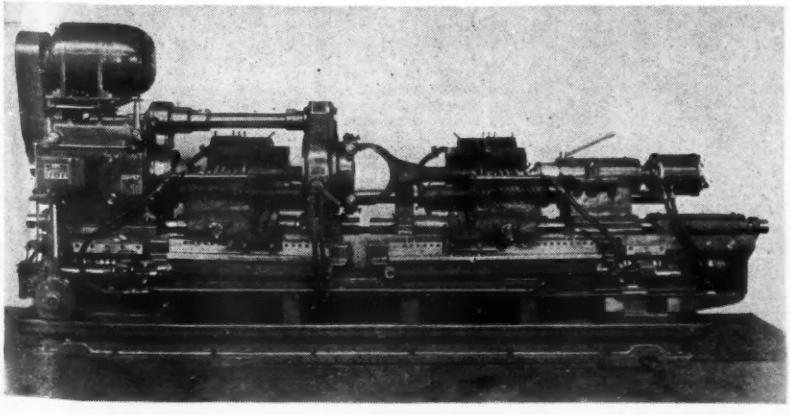
The Toledo Machine & Tool Co., Toledo, Ohio, a division of E. W. Bliss Co., has announced an improved "Die Spotting" press. It is used for the final fitting or "spotting" of the shaped surface of large drawing and forming dies. The press is arranged for individual direct connected motor drive, the motor being a reversible variable speed and high torque type.

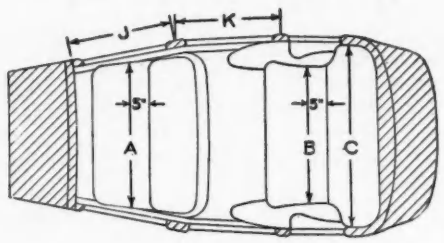
The bed has an area of 160 in. by 140

(Turn to page 64, please)



(Right) Baush deep hole boring machine
(Below) J & L Fay automatic lathe with center drive attachment



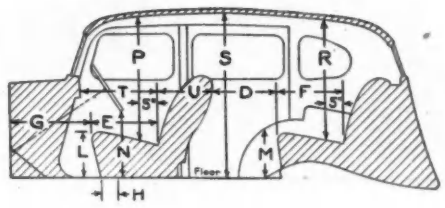


Body and Equipment Specifications

CAR MAKE AND MODEL	F. O. B. Price—(footnote)	Number of Passengers	Wheelbase—Inches	Shipping Weight	Number of Doors	Gear Ratio	Tire Size—Inches	Speedometer—Make	Gasoline Gage Make and Type	Thermometer—Make	Car Lock: Make	Car Lock: Type	Safety Glass: Make	Safety Glass: Location	Safety Glass: Extra Cost Installed Throughout	Windshield Cleaner Make and Type	Bumper—Make	Built-In Compartment for Trunk	Wired for Radio: Antenna Material	Wired for Radio: Antenna Location	Wired for Radio: Lead-In—Location	Shock Absorbers: Make	Shock Absorbers: One or Two-Way Type	Standard Wheels: Make	Standard Wheels: Type	Body—Make
AMERICAN-BANTAM																										
Business Coupe	335	1	120*	....	2	....	4.75/16	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	LS	.....	.....	.....	Own	.....	.....	SA	Own
Standard Coupe	365	2	120*	....	2	....	4.75/16	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	LS	.....	.....	.....	Own	.....	.....	SA	Own
Roadster	385	2	120*	....	2	....	4.75/16	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	LS	.....	.....	.....	Own	.....	.....	SA	Own
De Luxe Coupe	385	2	120*	....	2	....	4.75/16	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Yes	.....	.....	.....	Own	.....	.....	SA	Own
Custom Roadster	445	2	120*	....	2	....	4.75/16	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Yes	.....	.....	.....	Own	.....	.....	SA	Own
BUICK																										
Model 40—Special																										
Business Coupe	765	2	122	....	2	4.40	6.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Sedan—2-door	810	5	122	3484	2	4.40	6.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Sport Coupe—2-door	825	4	122	....	2	4.40	6.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Sedan—Trunk—2-door	835	5	122	3479	2	4.40	6.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Sedan—4-door	845	5	122	3509	4	4.40	6.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Sedan—Trunk—4-door	870	5	122	3519	4	4.40	6.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Conv. Coupe—2-door	905	4	122	....	2	4.40	6.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Conv. Phaeton—4-door	1145	5	122	....	4	4.40	6.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Model 60—Century																										
Sedan—2-door	1000	5	126	....	2	3.90	7.00/15	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Sport Coupe—2-door	1015	4	126	....	2	3.90	7.00/15	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Sedan—Trunk—2-door	1025	5	126	....	2	3.90	7.00/15	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Sedan—4-door	1035	5	126	....	4	3.90	7.00/15	AC	SC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Sedan—Trunk—4-door	1060	5	126	....	4	3.90	7.00/15	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Conv. Coupe—2-door	1095	4	126	....	2	3.90	7.00/15	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Conv. Phaeton—4-door	1345	5	126	....	4	3.90	7.00/15	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	LS	RB	RB	LP	Delco	2	MW	SD	Fisher
Model 80—Roadmaster																										
Sedan—Trunk—4-door	1275	6	131	4131	4	4.22	7.00/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Formal Sed.—Trunk—4-door	1395	6	131	4216	4	4.22	7.00/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Phaeton—Trunk—4-door	1565	6	131	....	4	4.22	7.00/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Model 90—Limited																										
Sedan Trunk—4-door	1725	6	138	4461	4	4.62	7.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Sedan—Trunk—4-door	1895	6	138	4541	4	4.62	7.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Formal Sedan, Trunk, 4-door	1895	8	138	4541	4	4.62	7.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
Limousine, Trunk—4-door	1995	8	138	4596	4	4.62	7.50/16	AC	AC-E	AC	B&S	I-S	LOF	TO	No	Tri-V	Own	Yes	RB	RB	LP	Delco	2	MW	SD	Fisher
CADILLAC																										
V8—Series 60																										
Sport Coupe—2-door	1445	2-4	124	3710	2	3.69	7.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fisher
Touring Sedan—4-door	1545	5	124	3845	4	3.69	7.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fisher
Conv. Coupe—2-door	1575	2-4	124	3745	2	3.69	7.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	MW	SD	Fisher
Conv. Sedan—4-door	1885	5	124	3885	4	3.69	7.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fisher
V8-Series 65																										
Touring Sedan—4-door	1945	5	131	4385	4	4.30	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fisher
V8—Series 70																										
Touring Sedan	2445	5	131	4420	4	4.30	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Sport Coupe	2645	2-4	131	4285	2	4.30	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	MW	SD	Fleet
Conv. Coupe	2745	2-4	131	4325	2	4.30	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	MW	SD	Fleet
Conv. Sedan	2795	5	131	4460	4	4.30	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
V8—Series 75																										
Touring Sedan	2645	5	138	4745	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Touring Sedan	2795	7	138	4825	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Imp. Sedan—No Trunk	....	7	138	....	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	MW	SD	Fleet
Imp. Touring Sedan	3695	7	138	4985	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Town Sedan	3845	5	138	4780	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Conv. Sedan	4145	5	138	4980	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Formal Sedan—No Trunk	4195	5	138	4745	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	MW	SD	Fleet
Town Car—No Trunk	5245	7	138	5055	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	MW	SD	Fleet
V12—Series 85																										
Touring Sedan	3345	5	138	5050	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Touring Sedan	3495	7	138	5130	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Imp. Sedan—No Trunk	....	7	138	....	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	MW	SD	Fleet
Imp. Tour. Sedan	3695	7	138	5165	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Town Sedan	3845	5	138	5000	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Conv. Sedan	4145	5	138	5165	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	Yes	No	No	No	Delco	2	MW	SD	Fleet
Formal Sedan—No Trunk	4195	5	138	5050	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	MW	SD	Fleet
Town Car—No Trunk	5245	7	138	5230	4	4.60	7.50/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	MW	SD	Fleet
V16—Series 90																										
Sedan	7350	7	154	6190	4	4.64	7.50/17	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	KH	WI	Fleet
Imp. Sedan	7550	7	154	6210	4	4.64	7.50/17	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Eaton	No	No	No	No	Delco	2	KH	WI	Fleet

Footnote: Prices listed have not been changed to conform with new A.M.A. pricing policy.

These data on the 1937 passenger cars have been supplied to AUTOMOTIVE INDUSTRIES by the automobile manufacturers



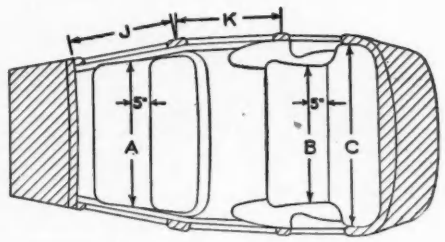
Body—Material	Top Frame Type 1-Wire Mesh 2-Longitudinal Slats 3-Steel	Lacquer—Make	Hardware—Make	Is Steering Column Adjustable (Range in Inches)	BODY DIMENSIONS—Inches (See diagrams above) A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	Overall Height Road to Roof—Inches
Steel	.....	.....	.....	No	.....	.....	.....	.....	16	.....	25½	.....	.....	.....	8¾	.....	16¾	34	.....	36½	.....	.....	60
Steel	.....	.....	.....	No	.....	.....	.....	.....	16	.....	25½	.....	.....	.....	8¾	.....	16¾	34	.....	.....	.....	.....	60
Steel	.....	.....	.....	No	.....	.....	.....	.....	16	.....	25½	.....	.....	.....	8¾	.....	16¾	34	.....	.....	.....	.....	60
Steel	.....	.....	.....	No	.....	.....	.....	.....	16	.....	25½	.....	.....	.....	8¾	.....	16¾	34	.....	.....	.....	.....	60
Steel	.....	.....	.....	No	.....	.....	.....	.....	16	.....	25½	.....	.....	.....	8¾	.....	16¾	34	.....	.....	.....	.....	60
Steel	3	Du	Ter	4½	50	44	55	12½	18	20	23⅛	4	41¼	.....	13½	10½	19¾	34½	34½	48½	21½	8½	69⅛
Steel	3	Du	Ter	4¼	50	47	53¼	18½	18	19½	23⅛	4	41¼	.....	13½	14	19¾	34½	36	48½	21½	8½	69⅛
Steel	3	Du	Ter	4¼	50	44	55	12½	18	20	23⅛	4	44½	.....	13½	10½	19¾	34½	34½	48½	21½	8½	69⅛
Steel	3	Du	Ter	4¼	50	47	53¼	18½	18	19½	23½	4	44½	.....	13½	14	19¾	34½	36	48½	21½	8½	69⅛
Steel	3	Du	Ter	4¼	50	47	53¼	18½	18	19½	23½	4	34½	27½	13½	14	19¾	34½	36	48½	21½	8½	69⅛
Steel	3	Du	Ter	4¼	50	47	53¼	18½	18	19½	23⅛	4	34½	27½	13½	14	19¾	34½	36	48½	21½	8½	69⅛
Steel	S&W	Du	Ter	3¼	50	43	.....	.....	18	15½	23⅛	4	34½	.....	13½	14	19¾	34½	.....	.....	21½	8½	68
Steel	S&W	Du	Ter	3¼	50	47	49	13	17¾	19¾	26⅝	No	41¼	27½	13¼	14¾	19¾	34½	36	48½	25	8½	69
Steel	3	Du	Ter	4¼	50	47	53¼	18½	18	19½	23⅛	4	34½	.....	13½	14	19¾	34½	36	48½	21½	8½	68½
Steel	3	Du	Ter	4¼	50	44	55	12½	18	20	23⅛	4	44½	.....	13½	10½	19¾	34½	34½	48½	21½	8½	68½
Steel	3	Du	Ter	4¼	50	47	53¼	18½	18	19½	23⅛	4	41¼	.....	13½	14	19¾	34½	36	48½	21½	8½	68½
Steel	3	Du	Ter	4¼	50	47	53¼	18½	18	19½	23⅛	4	34½	27½	13½	14	19¾	34½	36	48½	21½	8½	68½
Steel	3	Du	Ter	4¼	50	47	53¼	18½	18	19½	23⅛	4	34½	27½	13½	14	19¾	34½	36	48½	21½	8½	68½
Steel	S&W	Du	Ter	3¼	50	43	.....	.....	18	15½	23⅛	4	41¼	.....	13½	14	19¾	34½	.....	.....	21½	8½	67¾
Steel	S&W	Du	Ter	3¼	50	47	49	13	17¾	19¾	26⅝	No	34½	27½	13¼	14¾	19¾	34½	36	48½	25	8½	68¾
S&W	3	Du	Ter	4¼	49	48½	53½	15¼	19	19½	23½	4	36½	29½	13¼	14	20¼	35	36¾	49½	22¼	16	71⅛
S&W	3	Du	Ter	4¼	49	48½	53½	15¼	19	19½	26¾	No	36½	29½	13	14	20¼	36	36¾	49½	25½	12¾	71⅛
S&W	S&W	Du	Ter	3¼	48	48½	49	16¼	18	19	28	No	36½	29½	13½	13¾	20¼	36	36½	49	26¼	9	70½
S&W	3	Du	Ter	4¼	49	50	55¼	23¼	18¾	19¾	24¼	4	38⅝	32	13¼	14½	20⅜	35	36½	49	23¼	18¾	72⅛
S&W	3	Du	Ter	4¼	49	50	55¼	24⅝	19¼	19¼	28¾	No	38⅝	32	13	14½	20⅜	35½	36½	49	26¾	13	72⅛
S&W	3	Du	Ter	4¼	49	50	55¼	27¼	18¾	19¾	24¼	4	38⅝	32	13¼	14	20⅜	35	35¼	49	22¼	18	72⅛
S&W	3	Du	Ter	4¼	49	50	55¼	27¼	17½	19¾	27¼	No	38⅝	32	13½	14	20⅜	36	35½	49	25	15¼	72⅛
Steel	3	RM	Ter	No	53	.....	.....	.....	18	.....	22½	4	41¼	.....	15⅛	.....	20	38¾	.....	50	22¼	13 3/16	67⅞
Steel	3	RM	Ter	No	53	47	53⅛	19¼	18	20	22½	4	33¾	27⅛	15⅛	14½	20	37	36½	50¼	22¼	13⅝	67⅝
Steel	.....	RM	Ter	No	53	.....	.....	.....	18	.....	22½	4	41	.....	15⅛	.....	20	35¼	.....	47¾	22¼	13 1/16	66½
Steel	.....	RM	Ter	No	53	47	49	13⅝	18⅝	20	25¼	No	34¼	27⅜	14½	15¼	20	37½	37	49¾	25 1/16	14½	66¾
S&W	3	RM	Ter	No	53½	48	53½	15	18½	20¾	22½	4	36	29½	15¼	14½	20 11/32	38	37	50 1/16	22½	14¼	69½
S&W	3	RM	Ter	No	53½	46	53½	15	18½	20¾	22½	4	36	29½	15¼	14½	20 11/32	38	37	50 1/16	22½	14¾	69½
S&W	3	RM	Ter	No	53½	.....	.....	.....	18½	.....	23⅛	4	42½	.....	14⅝	.....	20 11/32	37¼	.....	49 1/16	23	13½	68 1/16
S&W	.....	RM	Ter	No	53	.....	.....	.....	18½	.....	23⅛	4	40⅜	.....	14⅝	.....	20 11/32	36¼	.....	47⅛	23	13½	67 1/16
S&W	.....	RM	Ter	No	52¾	48	49½	16½	18	19⅜	25¾	No	36½	29½	14¼	14¼	20 11/32	38	38½	50 1/16	25⅛	14 1/16	68 11/16
S&W	3	RM	Ter	No	53½	51	55⅝	23⅝	18½	20⅛	22½	4	38½	32	15½	15¾	20 11/32	37¼	37	50 11/32	22½	14¾	70
S&W	3	RM	Ter	No	53½	51	55⅝	32⅝	18½	20⅛	22½	4	38½	32	15½	16 3/16	20 11/32	37¼	35½	50 11/32	22½	14⅝	70
S&W	3	RM	Ter	No	.....	.....	.....	32⅝	18¾	20½	22¾	4	.....	.....	15½	16 1/16	20 11/32	.....	.....	.....	21¼	12⅝	.....
S&W	3	RM	Ter	No	.....	.....	.....	32⅝	18¾	20½	22¾	4	.....	.....	15½	16 3/16	20 11/32	.....	.....	.....	21¼	12⅝	.....
S&W	3	RM	Ter	No	.....	.....	.....	14	18⅝	20⅝	.....	4	.....	.....	15¼	15¾	20 11/32	.....	.....	.....	22¼	14⅞	.....
S&W	.....	RM	Ter	No	52¾	48	51¾	14⅛	18⅝	20⅝	24¾	No	40¼	32½	14½	15¾	20 11/32	37¾	36	49	22⅝	13⅝	68⅛
S&W	3	RM	Ter	No	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	20 11/32	.....	.....	.....	.....	.....	.....
S&W	3	RM	Ter	No	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	20 11/32	.....	.....	.....	.....	.....	.....
S&W	3	RM	Ter	No	53½	51	55⅝	23⅝	18½	20⅛	22½	4	38½	32	15½	15¾	20 11/32	37¼	37	50 11/32	22½	14¾	70
S&W	3	RM	Ter	No	53½	51	55⅝	32⅝	18½	20⅛	22½	4	38½	32	15½	16 3/16	20 11/32	37¼	35½	50 11/32	22½	14⅝	70
S&W	3	RM	Ter	No	.....	.....	.....	32⅝	18¾	20½	22¾	4	.....	.....	15½	16 1/16	20 11/32	.....	.....	.....	21¼	12⅝	.....
S&W	3	RM	Ter	No	.....	.....	.....	32⅝	18¾	20½	22¾	4	.....	.....	15½	16 3/16	20 11/32	.....	.....	.....	21¼	12⅝	.....
S&W	3	RM	Ter	No	.....	.....	.....	14	18⅝	20⅝	.....	4	.....	.....	15¼	15¾	20 11/32	.....	.....	.....	22¼	14⅞	.....
S&W	.....	RM	Ter	No	52¾	48	51¾	14⅛	18⅝	20⅝	24¾	No	40¼	32½	14½	15¾	20 11/32	37¾	36	49	22⅝	13⅝	68⅛
S&W	3	RM	Ter	No	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	20 11/32	.....	.....	.....	.....	.....	.....
S&W	3	RM	Ter	No	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	20 11/32	.....	.....	.....	.....	.....	.....
S&W	3	RM	Ter	No	52	51	56¼	41	18	20	24	4	42	33½	12	14½	18	38	37	49½	.....	.....	69½
S&W	3	RM	Ter	No	52	51	56¼	37	18	20	28	No	42	33½	12	14½	18	38	37	49½	.....	.....	69½

BODY DIMENSIONS

A—Width of front seat cushion, measured 5 inches from back
B—Width of rear seat cushion, measured 5 inches from back
C—Shoulder room, rear
D—Distance from back of front seat to front of rear cushion with front seat in its extreme forward position
E—Depth of front seat cushion
F—Depth of rear seat cushion
G—Distance from dash to front of front cushion with seat in its extreme forward position
H—Amount of front seat adjustment
J—Width of front door, at belt
K—Width of rear door, at belt
L—Height of front seat cushion
M—Height of rear seat cushion
N—Distance from steering wheel to floor with steering wheel in its lowest position
P—Head room at front seat measured 5 inches from back
R—Head room at rear seat, measured 5 inches from back
S—Height inside, floor to headlining
T—Distance from instrument board to back of front seat
U—Horisontal depth of front seat back

ABBREVIATIONS

†—At extra cost
*—Overall length, including bumpers
§—Driver's seat only
B&S—Briggs & Stratton
Buck—Buckeye
Chi—Chicago
Del-L—Delco-Lovejoy
Doug—Douglass
Du—DuPont
DR—Delco-Remy
E—Electric
Fer—Ferro
Fleet—Fleetwood
F-LP—Front of left pillar
Gab—Gabriel
Gord—Gordon
HD—Hancock-Dura
Houde—Houdaille
Hurd—Hurd Lock Co.
I—Ignition
IS—Ignition and Steering
Jar—W. B. Jarvis Co.
JK—Jarvis & Keeler
KH—Kelsey-Hayes
KS—King-Seeley
LOF—Libby-Owens-Ford
LP—Left Pillar
LS—Luggage Space
Mich—Michigan
Mit—Mitchell Specialty Co.
Mon—Monroe
Mot—Moto Meter Gauge & Equipment Div.
Mur—Murphy Paint & Lacquer Co.
MW—Motor Wheel
No—No or None
NaSe—Nash-Seaman
Oak—Oakes
PPG—Pittsburgh Plate Glass Co.
RB—Running Board
Rd—Rods
Rf—Roof
RM—Rinshed & Mason
RP—Right Pillar
SA—Steel—Artillery type
SAD—Steel—Artillery or Disc type
Sc—Screen
SD—Steel—Disc type
Sh Pr—Shatterproof
S-M—Stewart-Warner and Moto Meter
SS—Steel Spoke
Stan—Standard Steel Spring Co.
Ste—Stewart-Warner
S&W—Steel and Wood
Ter—Ternstedt
TO—Throughout
Tri—Trico
UC—Under Car
V—Vacuum
Var—Various
W—Windshield only
Wi—Wire
WV—Windshield and Ventilators only
YT—Yale & Towne Mfg. Co.

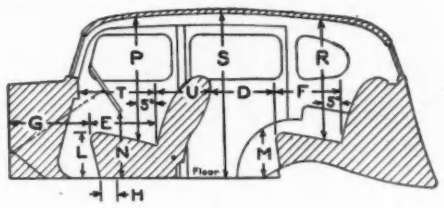


Body and Equipment

CAR MAKE AND MODEL	F. O. B. Price—(footnote)	Number of Passengers	Wheelbase—Inches	Shipping Weight	Number of Doors	Gear Ratio	Tire Size—Inches	Speedometer—Make	Gasoline Gage Make and Type	Thermometer—Make	Car Lock		Safety Glass			Windshield Cleaner Make and Type	Bumper—Make	Built-In Compartment for Trunk	Wired for Radio			Shock Absorbers		Standard Wheels		Body—Make
											Make	Type	Make	Location	Extra Cost Installed Throughout				Antenna Material	Antenna Location	Lead-In—Location	Make	One or Two-Way Type	Make	Type	
CHEVROLET																										
Master																										
Coupe	525	2	112½	....	2	3.73	6.00/16	AC	AC-E	No	DR	I	LOF	TO	No	Tri-V	Own	No	No	No	No	Delco	1	Own	SD	Fisher
Coach	535	5	112½	....	2	3.73	6.00/16	AC	AC-E	No	DR	I	LOF	TO	No	Tri-V	Own	No	No	No	No	Delco	1	Own	SD	Fisher
Cabriolet	555	4	112½	....	2	3.73	6.00/16	AC	AC-E	No	DR	I	LOF	TO	No	Tri-V	Own	No	No	No	No	Delco	1	Own	SD	Fisher
Town Sedan	560	5	112½	....	2	3.73	6.00/16	AC	AC-E	No	DR	I	LOF	TO	No	Tri-V	Own	Yes	No	No	No	Delco	1	Own	SD	Fisher
Sedan	600	5	112½	....	4	3.73	6.00/16	AC	AC-E	No	DR	I	LOF	TO	No	Tri-V	Own	No	No	No	No	Delco	1	Own	SD	Fisher
Sport Sedan	625	5	112½	....	4	3.73	6.00/16	AC	AC-E	No	DR	I	LOF	TO	No	Tri-V	Own	Yes	No	No	No	Delco	1	Own	SD	Fisher
Master De Luxe																										
Coupe	585	2	112½	....	2	4.22	6.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Own	No	No	No	No	Delco	1	Own	SD	Fisher
Coach	595	5	112½	....	2	4.22	6.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Own	No	No	No	No	Delco	1	Own	SD	Fisher
Sport Coupe	615	2-4	112½	....	2	4.22	6.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Own	No	No	No	No	Delco	1	Own	SD	Fisher
Town Sedan—Trunk	620	5	112½	....	2	4.22	6.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Own	Yes	No	No	No	Delco	1	Own	SD	Fisher
Sedan	660	5	112½	....	4	4.22	6.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Own	No	No	No	No	Delco	1	Own	SD	Fisher
Sport Sedan	685	5	112½	....	4	4.22	6.00/16	AC	AC-E	AC	DR	I	LOF	TO	No	Tri-V	Own	Yes	No	No	No	Delco	1	Own	SD	Fisher
CHRYSLER																										
Royal Six—C16																										
Business Coupe	715	2	116	2964	2	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Mon	2	MW	SD	Own
Coupe	765	2-4	116	3014	2	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Mon	2	MW	SD	Own
Conv. Coupe	....	2-4	116	....	2	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Mon	2	MW	SD	Own
Brougham	775	5	116	3029	2	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	LS	No	No	No	Mon	2	MW	SD	Own
Touring Brougham	785	5	116	3009	2	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Mon	2	MW	SD	Own
Sedan	815	5	116	3039	4	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	....	No	No	No	Mon	2	MW	SD	Own
Touring Sedan	825	5	116	3049	4	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Mon	2	MW	SD	Own
Conv. Sedan	....	5	116	....	4	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	LS	No	No	No	Mon	2	MW	SD	Own
Sedan	....	7	133	....	4	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	LS	No	No	No	Mon	2	MW	SD	Own
Sedan-Limousine	....	7	133	....	4	4.10	6.00/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Mon	2	MW	SD	Own
Imperial—C14																										
Business Coupe	925	2	121	3276	2	4.10	6.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Mon	2	MW	SD	Own
Coupe	965	2-4	121	3351	2	4.10	6.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Mon	2	MW	SD	Own
Conv. Coupe	....	2-4	121	....	2	4.10	6.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Mon	2	MW	SD	Own
Touring Brougham	965	5	121	....	2	4.10	6.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Mon	2	MW	SD	Own
Touring Sedan	995	5	121	3366	4	4.10	6.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Mon	2	MW	SD	Own
Conv. Sedan	....	5	121	....	4	4.10	6.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	LS	No	No	No	Mon	2	MW	SD	Own
Custom Imp. C15																										
Sedan	....	7	140	....	4	4.55	7.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Mon	2	MW	SD	Own
Sedan Limousine	....	7	140	....	4	4.55	7.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Mon	2	MW	SD	Own
Airflow—C17																										
Sedan	1475	6	128	4203	4	4.30	7.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	....	No	No	No	Mon	2	MW	SD	Own
Coupe	1475	6	128	4128	2	4.30	7.50/16	Ste	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Mon	2	MW	SD	Own
CORD—8																										
Model 812																										
Westchester Sedan	1995	5	125	3715	4	2.75	6.50/16	Ste	Ste-E	KS	Mit	I	PPG	TO	....	Tri-V	Buck	Yes	....	....	....	Delco	2	MW	SD	Own
Beverly Sedan	2095	4	125	3740	4	2.75	6.50/16	Ste	Ste-E	KS	Mit	I	PPG	TO	....	Tri-V	Buck	Yes	....	....	....	Delco	2	MW	SD	Own
Conv. Coupe	2145	2	125	3815	2	2.75	6.50/16	Ste	Ste-E	KS	Mit	I	PPG	TO	....	Tri-V	Buck	Yes	....	....	....	Delco	2	MW	SD	Own
Conv. Phae. Sedan	2195	5	125	3864	2	2.75	6.50/16	Ste	Ste-E	KS	Mit	I	PPG	TO	....	Tri-V	Buck	Yes	....	....	....	Delco	2	MW	SD	Own
DE SOTO																										
Model S3																										
Business Coupe	685	....	116	2954	2	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Delco	2	MW	SD	Own
Coupe—Ru. St.	735	....	116	3004	2	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Delco	2	MW	SD	Own
Conv. Coupe	....	3-5	116	....	2	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Delco	2	MW	SD	Own
Brougham	745	6	116	3039	2	4.10	6.00/16	Mot	Mot-E	Mot	TY	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Delco	2	MW	SD	Own
Tour. Brougham—Truck	755	6	116	....	2	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Delco	2	MW	SD	Own
Sedan	785	6	116	3039	4	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	LS	No	No	No	Delco	2	MW	SD	Own
Tour. Sedan	795	6	116	3064	4	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Delco	2	MW	SD	Own
Conv. Sedan	....	5	116	....	4	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	LS	No	No	No	Delco	2	MW	SD	Own
Sedan	....	7	116	....	4	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	....	No	No	No	Delco	2	MW	SD	Own
DODGE																										
Model D5																										
Business Coupe	640	2	115	2822	2	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Delco	2	Budd	SD	Own
Coupe—Ru. St.	695	2-4	115	2882	2	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Delco	2	Budd	SD	Own
Conv. Coupe	....	2-4	115	....	2	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	No	No	No	No	Delco	2	Budd	SD	Own
Sedan	705	5	115	2912	2	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	LS	No	No	No	Delco	2	Budd	SD	Own
Tour. Sedan—Trunk	715	5	115	2902	2	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Delco	2	Budd	SD	Own
Sedan	745	5	115	2912	4	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	LS	No	No	No	Delco	2	Budd	SD	Own
Tour. Sedan—Trunk	755	5	115	2912	4	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Delco	2	Budd	SD	Own
Sedan—Trunk	....	7	132	....	4	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Delco	2	Budd	SD	Own
Conv. Sedan—Trunk	....	5	115	....	4	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Delco	2	Budd	SD	Own
Limousine	....	5	115	....	4	4.10	6.00/16	Mot	Mot-E	Mot	YT	I	PPG	W-V	....	Tri-V	Var	Yes	No	No	No	Delco	2	Budd	SD	Own
FORD																										
Model V8-60																										
Coupe	460	2	112	....	2	4.44	5.50/16	.....	.....	.....	B&S	IS	Own	TO	....	Tri-V	Own	No	No	No	No	Houde	2	Own	SD	Own
Tudor Sedan	495	5	112	....	2	4.44	5.50/16	.....	.....	.....	B&S	IS	Own	TO	....	Tri-V	Own	Yes	No	No	No	Houde	2	Own	SD	Own
Tudor Tour. Sedan	520	5	112	....	2	4.44	5.50/16	.....	.....	.....	B&S	IS	Own	TO	....	Tri-V	Own	Yes	No	No	No	Houde	2	Own	SD	Own

Footnote: Prices listed have not been changed to conform with new A.M.A. pricing policy.

Specifications



Body—Material	Top Frame Type 1-Wire Mesh 2-Longitudinal Slats 3-Steel	Lacquer—Make	Hardware—Make	Is Steering Column Adjustable (Range in Inches)	BODY DIMENSIONS—Inches (See diagrams above) A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	Overall Height Road to Roof—Inches
Steel	3	....	Ter	No	46	.....	.....	.....	18 1/16	.....	22 11/16	4	33 5/8	.....	13 11/16	.....	19 3/8	35 9/16	.....	.....	22 11/16	13 1/4	66 1/8
Steel	3	....	Ter	No	21	45	50 1/2	14 1/2	18 5/8	18 5/8	22 11/16	4	43 1/16	.....	13 5/8	13 1/2	19 3/8	36 1/16	36 1/2	48 1/16	23 1/16	12	66 1/8
Steel	3	....	Ter	No	46	.....	.....	.....	18 3/8	.....	22 1/16	4	38 1/2	.....	13 1/16	.....	19 3/8	35 7/8	.....	.....	22 5/8	13 1/16	66 1/4
Steel	3	....	Ter	No	21	45	50 1/2	14 1/2	18 5/8	18 5/8	22 1/16	4	43 1/16	.....	13 5/8	13 1/2	19 3/8	36 1/16	36 1/2	48 1/16	23 1/16	12	66 1/8
Steel	3	....	Ter	No	48	45	50 1/2	13 1/2	18 1/16	18 5/8	22 1/16	4	33 5/8	28	13 11/16	13 1/2	19 3/8	36 1/16	36 1/2	48 1/16	22 1/16	12 1/16	66 1/16
Steel	3	....	Ter	No	48	45	50 1/2	13 1/2	18 1/16	18 5/8	22 1/16	4	33 5/8	28	13 11/16	13 1/2	19 3/8	36 1/16	36 1/2	48 1/16	22 1/16	12 1/16	66 1/16
Steel	3	....	Ter	No	46	.....	.....	.....	18 1/16	.....	22 1/16	4	38 5/8	.....	13 11/16	.....	19 3/8	35 9/16	.....	.....	22 11/16	13 1/4	66 1/8
Steel	3	....	Ter	No	46	45	50 1/2	13 1/2	18 1/16	18 5/8	22 1/16	4	43 1/16	.....	13 11/16	13 1/2	19 3/8	36 1/16	36 1/2	48 1/16	22 1/16	12 1/16	66 1/16
Steel	3	....	Ter	No	46	.....	.....	.....	18 1/16	.....	22 1/16	4	38 5/8	.....	13 11/16	.....	19 3/8	35 7/16	.....	.....	22 1/16	12 1/16	66 1/8
Steel	3	....	Ter	No	46	45	50 1/2	13 1/2	18 1/16	18 5/8	22 1/16	4	43 1/16	.....	13 11/16	13 1/2	19 3/8	36 1/16	36 1/2	48 1/16	22 1/16	12 1/16	66 1/16
Steel	3	....	Ter	No	48	45	50 1/2	13 1/2	18 1/16	18 5/8	22 1/16	4	33 5/8	28	13 11/16	13 1/2	19 3/8	36 1/16	36 1/2	48 1/16	22 1/16	12 1/16	66 1/16
Steel	3	....	Ter	No	48	45	50 1/2	13 1/2	18 1/16	18 5/8	22 1/16	4	33 5/8	28	13 11/16	13 1/2	19 3/8	36 1/16	36 1/2	48 1/16	22 1/16	12 1/16	66 1/16
Steel	3	Dit	Jar	....	47	.....	.....	.....	18 1/2	.....	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	.....	.....	.....	18 1/2	.....	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 1/2	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	47	.....	.....	.....	18 1/2	.....	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	.....	.....	.....	18 1/2	.....	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	49 1/2	51 1/2	55 3/4	.....	18 1/2	19	21 3/4	4	43 1/4	37 1/8	15	15 1/8	.....	37 1/4	37 1/4	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	49 1/2	51 1/2	55 3/4	.....	18 1/2	19	21 3/4	.....	43 1/4	37 1/8	15	15 1/8	.....	37 1/4	37 1/4	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	49 1/4	48	.....	.....	18 1/4	19	.....	3 1/2	30 3/4	30 3/4	15 1/4	14	.....	36 3/4	36	49	.....	.....	.....
Steel	3	Dit	Jar	....	49 1/4	.....	.....	.....	18 1/4	.....	.....	3 1/2	.....	.....	15 1/4	.....	.....	36 3/4	.....	.....	.....	.....	.....
Steel	3	Mur	.....	1 1/4	46 1/2	48 1/2	46 1/2	16 1/2	20	21 1/2	23	4	35 1/2	35 1/2	14 1/2	14 1/2	19	38	39	49 1/2	24	13	60
Steel	3	Mur	.....	1 1/4	41	43	46 1/2	12	20	23	21 1/2	4	35 1/2	35 1/2	13 1/2	14	19	38	39	49 1/2	25	12	60
Steel	3	Mur	.....	1 1/4	49	.....	.....	.....	18	.....	21	3	44	.....	13 1/2	.....	19	35 1/2	.....	.....	23	11	58
Steel	3	Mur	.....	1 1/4	49	45	46	9 1/2	18	18 1/2	21	3	44	.....	13 1/2	14	19	35 1/2	35	47	23	11	58
Steel	3	Dit	Jar	....	47	.....	.....	.....	18 1/2	.....	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	.....	.....	.....	18 1/2	.....	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	34 7/8	28 1/2	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	47	.....	.....	.....	18 1/2	.....	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	.....	.....	.....	18 1/2	.....	21 3/4	4	.....	.....	14 3/4	.....	.....	38	.....	.....	20 1/2	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	.....	.....	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	34 7/8	28 1/8	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	47	48 1/2	52 3/4	.....	18 1/2	19	21 3/4	4	34 7/8	28 1/8	14 3/4	15 1/8	.....	38	37	50	20 1/2	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Dit	Jar	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steel	3	Var	Own	No	50	.....	.....	.....	18	.....	.....	4	40	.....	.....	.....	.....	37	.....	.....	.....	.....	66 1/2
Steel	3	Var	Own	No	50 1/2	47	.....	22 1/2	18	18 1/2	.....	4	40	.....	.....	.....	.....	37	.....	.....	.....	.....	66
Steel	3	Var	Own	No	50 1/2	47	.....	22 1/2	18	18 1/2	.....	4	40	.....	.....	.....	.....	37	.....	.....	.....	.....	66

BODY DIMENSIONS

A—Width of front seat cushion, measured 5 inches from back
B—Width of rear seat cushion, measured 5 inches from back
C—Shoulder room, rear
D—Distance from back of front seat to front of rear cushion with front seat in its extreme forward position
E—Depth of front seat cushion
F—Depth of rear seat cushion
G—Distance from dash to front of front cushion with seat in its extreme forward position
H—Amount of front seat adjustment
J—Width of front door, at belt
K—Width of rear door, at belt
L—Height of front seat cushion
M—Height of rear seat cushion
N—Distance from steering wheel to floor with steering wheel in its lowest position
P—Head room at front seat, measured 5 inches from back
R—Head room at rear seat, measured 5 inches from back
S—Height inside, floor to headlining
T—Distance from instrument board to back of front seat
U—Horisontal depth of front seat back

ABBREVIATIONS

†—At extra cost
‡—Driver's seat only
B&S—Briggs & Stratton
Buck—Buckeye
Chi—Chicago
Del-L—Delco-Lovejoy
Dit—Ditzler Color Co.
Doug—Douglass
Du—DuPont
DR—Delco-Remy
E—Electric
Fer—Ferro
Fleet—Fleetwood
F-LP—Front of left pillar
Gab—Gabriel
Gord—Gordon
HD—Hancock-Dura
Houde—Houdaille
Hurd—Hurd Lock Co.
I—Ignition
IS—Ignition and Steering
Jar—W. B. Jarvis Co.
JK—Jarvis & Keeler
KH—Kelsey-Hayes
KS—King-Seeley
LOF—Libby-Owens-Ford
LP—Left Pillar
LS—Luggage Space
Mich—Michigan
Mit—Mitchell Specialty Co.
Mon—Monroe
Mot—Moto Meter Gauge & Equipment Div.
Mur—Murphy Paint & Lacquer Co.
MW—Motor Wheel
No—No or None
NaSe—Nash-Seaman
Oak—Oakes
PPG—Pittsburgh Plate Glass Co.
RB—Running Board
Rd—Rods
Rf—Roof
RM—Rinshed & Mason
RP—Right Pillar
SA—Steel—Artillery type
SAD—Steel—Artillery or Disc type
Sc—Screen
SD—Steel—Disc type
Sh Pr—Shatterproof
S-M—Stewart-Warner and Moto Meter
SS—Steel Spoke
Stan—Standard Steel Spring Co.
Ste—Stewart-Warner
S&W—Steel and Wood
Ter—Ternstedt
TO—Throughout
Tri—Trico
UC—Under Car
V—Vacuum
Var—Various
W—Windshield only
Wi—Wire
WV—Windshield and Ventilators only
YT—Yale & Towne Mfg. Co.

Motors Move Mountains

(Continued from page 47)

tons, this is not to be wondered at. Idler guides are made longer, to clamp all the way under the bottom of roller frames, to add strength. Heavier idlers are put on, made of manganese steel. Gussets are put on bulldozer arms, etc. As a matter of fact, they can and do rebuild almost anything on a machine, if by so doing hours can be saved in lay-up time.

Lederer was asked if he thought that new and more rugged designs were called for on the part of the manufacturer. His reply was to the effect that the equipment as it stands now is exceptionally strong and serviceable—much more so than five years ago. As to the advisability of new types and numbers being brought out to fit the particular conditions of construction jobs such as Grand Coulee, that involved questions of market and volume which the manufacturer could best answer.

Quoting Jack Douglass, foreman of the light truck department: "Considering what a truck can be bought for today, and its cost of operation, I would say that we are at least a third better off than we were five years ago. The outstanding improvements have been in motors—higher compression and better materials, which latter mean longer life. Also, the set-up of bearings and gears designed for the present transmission and differential is much better than it was five years ago."

All repairs and servicing of light trucks are done in his department, except welding and machining. A new feature in connection with Douglass's work is a completely equipped tire repair shop for making section, spot and reinforcement repairs. Repairs are made not only on the small truck tires, but on those of the heavy equipment, which run up to and include 13.50/24. This department, which was started about the first of August, is already showing a saving of about 50 per cent over commercial work at the nearest large cities, about 100 mi. distant. And there is ample opportunity to make savings when it is considered that on the heavy equipment alone, above 10.50/20, there are 265 tires in use at all times and 35 more on the rack.

Lubricants as well as fuel come under the supervision of the lubrication engineer, William Warrens, whose headquarters are at the main oil house. There are also four oil substations at strategic points on the job. One lubricating truck makes the rounds day and night with six grease monkeys aboard, while others are stationed at various points who do not ride the truck. All petroleum products are checked out through the main oil house. Both fuel and lubricants are charged to the individual piece of equipment.

Most of the petroleum products are obtained from one of the major Pacific Coast oil companies, and so great is the demand that this company maintains a major plant at Grand Coulee. A fair average monthly consumption is:

Gasoline	90,000 gal.
Internal combustion automotive oils (not including caterpillars)	3300 gal.
Industrial lubricating oils	13,300 gal.
Automotive greases	3200 gal.

BLISS & LAUGHLIN, INC.
COLD DRAWN STEEL
Set screws fabricated from B & L Alloy Steel SAE 4130, annealed to proper structure and cold drawn.
ALLOY STEELS
Cluster gear of B & L Alloy Steel, developed to overcome field hazards and to provide improved machinability.
Clash gear fabricated from controlled SAE 2315 and heat treated to increase service life under exacting conditions.

Behind the modern motor car, with its amazing power and speed, is a story of achievement with *alloy steels*—developing greater strength yet saving weight, increasing wear resistance and prolonging car life. B & L Cold Finished Alloy Steels bring these advantages to the manufacturer and, in addition, they provide a convenient and dependable material to work with—accurate in size and section, uniform in quality and physical character, and with a smooth, cold drawn finish that minimizes machining requirements. Your inquiries are invited on alloy steel problems.

Cold Drawn Bars • Ground Shafting • Ultra-Cut Steel • Alloy Steels

BLISS & LAUGHLIN, INC.

HARVEY, ILL. *Sales Offices in all Principal Cities* **BUFFALO, N.Y.**

New Engineering Materials

A NUMBER of new developments in engineering materials are referred to in the annual review of the General Electric Co.

Further research on precipitation hardening of permanent magnet alloys revealed means of producing a variety of characteristics through combinations of various compositions with heat treatments. A wider field of applications can be satisfactorily served with these

materials, and the range of physical conditions under which they remain magnetically stable has been extended.

A new method of producing these alloys, well adapted to production of small parts, results in a material with equal magnetic properties, but with five times the transverse modulus of rupture and ten times the tensile strength of previous grades. The use of these materals has made possible the developments of new devices of interesting and valuable characteristics, particularly in the field of control and aircraft apparatus.

Silver-lead oxide contacts are made up from powders and are essentially a mixture of silver and lead oxide with a little molybdenum added to increase the resistance to wear. They are pressed to the desired shape and then sintered to a red heat, producing a tip comparatively free from sticking while still retaining high electrical conductivity.

These contact tips are now in production and are already being used on various classes of apparatus.

Chemists and insulation engineers have watched for several years the development of flexible synthetic plastic materials such as cellulose acetate, Glyptal, Duprene, and Thiokol. Flamenol is a newcomer in this field and, although in its present form it has been known for only a relatively short time, strides have been made in its development and application that are worthy of note.

Fan Design

In our issue of Sept. 12, under Automotive Abstracts there appeared an item relating to an article on Fan Design by Dr. Ernst Drucker of Vienna Technical College, in *Automobiltechnische Zeitschrift*. In the abstract it was stated that the article related only to fans with helical blades having blade sections similar in form to airplane wings. We have received a letter from Doctor Drucker in which he states that although the schematic illustrations at the beginning of the article showed blade sections of that form, the treatment is quite general and covers fans with pressed-steel blades as well.

A NEW Diesel fuel having superior anti-knock qualities has been patented by the Bataafsche Petroleum Company of Holland (French patent No. 444,544). In order to reduce ignition delay and thus to suppress knock, an addition of a peroxide of acetone is made to the petroleum fuel, or of one of its homologues, such as peroxide of methyl-ethyl-cetone, peroxide of di-ethyl-cetone, or peroxide of di-isopropyl-cetone.

Big LITTLE CONTROLS

SMALL in respect of size, but of great importance in point of work they do, are Clark Controls, available in a wide range of types, sizes and applications. Small, they yet account for veritable batteries of huge machinery—assist with major aspects of production. See if they do not prove a big factor in making your operations more profitable, reducing maintenance and promoting the standards you have set for 1937.

Illustrated—Clark Air-operated Contactor for Spot Welder

THE CLARK CONTROLLER COMPANY

1146 EAST 152nd STREET CLEVELAND, OHIO

New Developments

(Continued from page 57)

in. and five T-slots for clamping. There are two screw operated pushers driven by an electric motor through a clutch that allows the pushers to be reversed. Limit switches stop the slide travel at extreme top and bottom.

These presses can be furnished with the planer type table if desired. In case more pressure is needed, machines are furnished with hydraulic operating cylinders in place of screws.

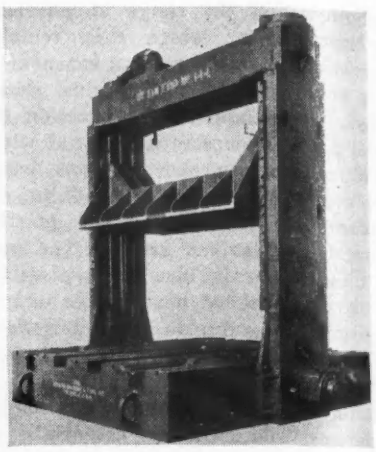
Grinding Gages

Arnold Automatic Instruments Made More Rugged

The Arnold Gauge Co., Flint, Mich., has announced through Federal Products Corp., Providence, R. I., that improved models of their automatic grinding gages are now available.

These instruments, now made more rigid by the use of stronger materials and construction, are said to be much easier to adjust than the old models. They are available for ordinary cylindrical grinding for diameter only and. in addition, for automatically gaging the width between shoulders as well as for gaging both diameter and width while grinding.

Where it is desired to check diameters having keyways, oil grooves, splines, and similar work, special radius shoes are furnished which ride over the openings and give a continuous check without interference.



Toledo "Die Spotting" press

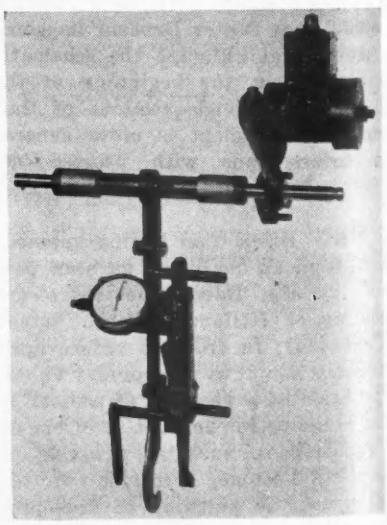
Brass Die Casting

Casting Metal Well In Each Die Is Feature Of New Machine

The Madison-Kipp Corp., Madison, Wis., has announced new equipment for casting brass and rigid aluminum by the high-pressure method of casting metals in the plastic state.

One of the features of the plastic metal type of casting machine is that the casting metal well is provided in each die. This well is made to the proper size for the forcing plunger of the machine. A small amount of clearance is provided for ease of operation. The clearance is varied somewhat with the type of metal to be cast.

Arnold automatic grinding gage



WELL WORTH LOOKING AFTER!

Call Room Number 1023 at the Book-Cadillac Hotel during the Convention.

At the Detroit S. A. E. Convention, Vaco Products, Inc. will demonstrate something new in semi-automatic gear shifting and clutch control.

Radically different, this newest means of power shifting is silent, selective and fool proof. It is a definite contribution to safe and effortless driving.

Engineers seeking a practical, fully proved means of automatic gear shifting which can be installed on any make of car, taxi or bus should call Hal Holtom at the "Book" and arrange for a demonstration ride. Unquestionably this new device is an answer to the engineers prayer. Don't fail to see it and drive it if you wish.

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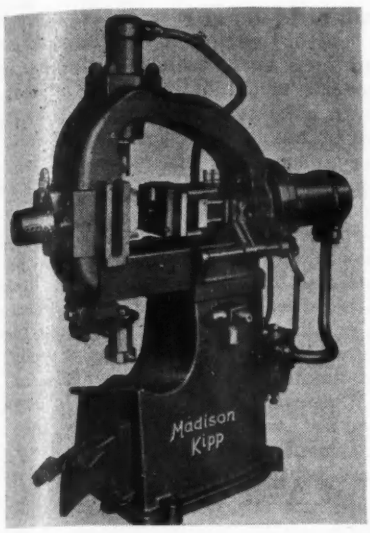
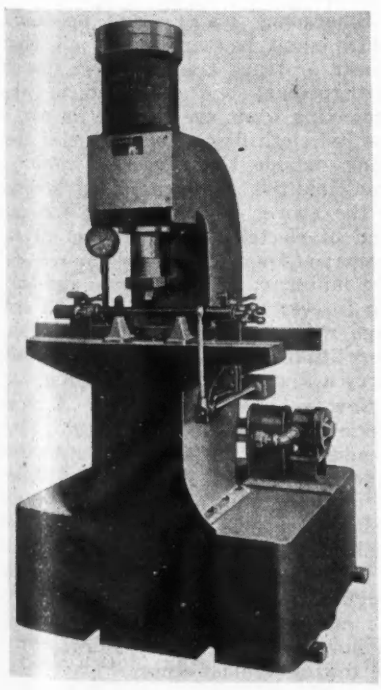


Madison-Kipp die casting machine

Provision is made in the machine so that ejection of the casting can be made on either the movable or the stationary half of the die. This permits more latitude than is usual in designing complicated dies and dies requiring special coring.

Line pressures up to 2500 lb. per sq. in. provide a die holding pressure of 30,000 lb. per sq. in., and 7700 lb. per sq. in. for the standard diameter metal forcing plunger. Arrangements for higher plunger pressures are available where necessary. The speed of travel of the forcing plunger may be regulated to suit the casting conditions of various metals and for particular requirements of special dies. In the larger machines the metal forcing pressures may exceed 20,000 lb. per sq. in.

Hannifin straightening press



Straightening Press

Ram Of Hannifin Machine Delivers 20 Tons Pressure

A hydraulic press for performing straightening operations on cam shafts, axle shafts, and for similar work requiring accurate straightening, has been developed by the Hannifin Mfg. Co., Chicago.

One lever controls the operation of the ram; when the control lever is moved in either direction the ram will move a proportional distance and then stop by automatically bringing the operating valve to neutral. The arc of movement of the lever is several times the ram stroke, providing for sensitive handling.

The ram delivers 20 tons pressure and may be fitted with any type of fixture required for handling the parts to be straightened. The ram stroke is 6 in. Speeds are: power stroke, 69 in. per min.; return stroke, 96 in. per min. Dimensions are: table to ram (up), 8½ in.; center of ram to face of frame, 7½ in.; length of table, 36 in.; floor to table, 40 in.; overall height approximately, 6 ft. 9 in.

"A Spicer Product"

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These three simple words tell an important story to the automotive world. It is a story that has withstood the test of time, because it carries truth, conviction and dignity.

The words "A **Spicer** Product" are really a guarantee—a guarantee of quality and dependability. Back of these words are an integrity of purpose, a strength of position and a pride of accomplishment, all of which contribute to the recognition and acceptance accorded **Spicer** Products by the entire automotive industry.

We are proud that the industry has come to rely upon the guarantee implied in the three words that head this message.

We are also naturally proud of our ability to supply products which unqualifiedly measure up to the most exacting requirements of the automotive field today.

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BROWN-LIPE CLUTCHES and TRANSMISSIONS
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SPICER UNIVERSAL JOINTS
PARISH FRAMES READING, PA.

ICC Motor Regulations

(Continued from page 37)

gross weight of 3000 lb. or less there shall be one tail lamp and two reflectors. If such semi-trailer or full trailer is so loaded or is of such dimensions as to obscure the stop light on the towing vehicle, it shall also be equipped with one stop light.

No lighting device on the front of the vehicle shall display any other color than white, yellow, or amber. All lighting devices at the rear shall display a red light except the stop light which may be red, amber, or yellow. Front clearance lamps shall be yellow provided that clearance lamps in present equipment may be green until replaced. Rear clearance lamps shall display a red color and side marker lamps shall display the same color when lighted as the clearance lamps to which they are adjacent.

Reflectors mounted on the sides shall reflect colors corresponding to those of the nearest clearance lamps. No reflector required by the regulations shall be mounted upon the vehicle at a height to exceed 30 in. nor less than 24 in. above the ground.

Every vehicle or combination of vehicles coming under the regulations shall be equipped with brakes adequate to control the movement of, and to stop and hold such vehicle, including two separate means of applying the brakes which shall be so constructed that failure of any one part of the operating mechanism shall not leave the vehicle without brakes adequate to stop and hold it.

Stopping distance specified, on a dry, smooth, level road, free from loose material, for a vehicle having brakes on all wheels is 30 ft. from a speed of 20 m.p.h. and 45 ft. for the same speed for vehicles or combinations of vehicles not having brakes on all wheels.

Whenever glass is replaced in certain specified windows and doors the replacement shall be made with safety glass conforming to the requirements of the American Standards Association.

Every vehicle having a windshield shall be equipped with at least one device for cleaning rain, snow or other moisture from the windshield in order to provide clear vision for the driver. At least one rear-vision mirror shall be attached to each vehicle. Every vehicle shall also, when operating under conditions such that ice or frost is likely to collect on the windshield, be equipped with a device or other means for preventing or removing such ice or frost. Vehicles shall be equipped with a horn which is adequate and reliable as a warning signal. Fuel tanks and intake pipes shall not project beyond the sides of a vehicle, nor shall they be located within or above the passenger-carrying portion of a bus.

Coupling devices of full trailers shall be so designed that the trailer will follow substantially in the path of the towing vehicle without swerving from side to side. In addition, trailers shall be coupled with stay chains or cables to the towing vehicle so as to prevent parting should the regular towing device break.

Emergency parts and accessories which shall be carried by all buses, trucks or truck tractors, are: one fire extinguisher; one red lantern, when projecting loads are carried, as well as one red cloth flag. Such vehicles operating outside the corporate limits of municipalities shall carry, in addition to the above, one spare bulb for each kind of electric lamp; one set of tire chains; at least three flares or red electric lanterns; at least three red-burning fusees; and at least two red cloth flags with standards. Buses carrying more than 10 passengers shall also carry a first-aid kit and a hand axe.

New vehicles acquired by a motor carrier on and after July 1, 1937, shall, in addition to the above requirements, have only electric lights; head lamps of dual or multiple beam type; and amber clearance lamps at the front. Such new vehicles shall have brakes on all wheels except when the gross weight of trailer does not exceed 3000 lb.; and such brakes shall be applied automatically when a breakaway from the towing vehicle occurs.

In Mechanics Roller Bearing Universal Joints friction is reduced to the minimum. Then there is generous provision for lubricant. One "shot" reaches all four bearings on the cross equally, another fills the slip-yoke chamber. Highly efficient durable seals halt leakage of lubricant or entrance of dirt and water. These, and other outstanding advantages, are the reasons why Mechanics Universal Joints are used on leading passenger cars, trucks, and busses. Investigate. Write today for complete information.

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Borg-Warner Corp. 1301 18th AVE., ROCKFORD, ILLINOIS

British Boom Slackens

(Continued from page 36)

vehicles, large numbers were converted during the year from gasoline to oil.

There were 1,604,948 passenger cars in use in Great Britain on Sept. 30 last, an increase of nearly 150,000; the number of trucks was 438,565 (23,805 increase); buses and coaches at 84,523 showed a decrease of 700.

Imports of passenger cars were down from approximately 13,000 to 9500, but truck imports increased from 2500 to 3200. The car imports equal 3.2 per cent of domestic sales and truck imports, 3.8 per cent.

Exports ran to 59,700 cars (50,219 in 1935) and 15,550 trucks and buses (against 14,835). These higher figures represent 16.8 per cent of car production (against 16.2 per cent in 1935) and 14.3 per cent of truck and bus production (against 16.1 per cent).

It is observed that domestic sales of cars will have to increase at a higher rate than the 11.1 per cent of the past year if the market is to absorb the increased production capacity of the British industry now available or planned. Austin, Morris, Ford, Standard and Vauxhall alone are capable of increasing their combined output by a good deal more than 11 per cent over that of 1935-36 and at least a 20 per cent increase of home sales during the current year will probably be necessary to justify all these firms producing to capacity. But such an increase is not at all improbable, for the reduced rate of increase during the past year may well be due to a reaction from the heavy buying of the previous three years that followed the deferred buying of the previous three years—the latter period representing the worst part of the industrial depression.

It may be recalled that the British motor industry made earlier recovery from the depression period than that of America; it has now beaten all previous records in home sales four years in succession, and the best pre-slump year (1929) was beaten as far back as 1933. So it is not altogether surprising that a lower rate of increase (11.1 per cent) was recorded in 1936 than in 1933 (24.6 per cent), 1934 (25.8 per cent) and 1935 (23.7 per cent).

Engine Rebuilders to Meet In Chicago, June 21-24

The 15th annual convention and meeting of the Automotive Engine Rebuilders Association has been scheduled for Chicago, June 21-24, 1937, it has been announced by the convention committee. Officers of the association for the current year are: L. C. Smith, Chicago, president; John L. Heckman, Chicago, secretary; C. W. Yount, Indianapolis, treasurer; P. C. Young, Toronto, Ont., first vice-president; James Pringle, Springfield, Mo., second vice-president; and R. G. Patterson, Indianapolis, executive vice-president.

NSPA November Sales 20% Above Last Year

November sales reported by manufacturers, members of the National Standard Parts Association, declined only two points on the NSPA monthly index in November from the preceding month. November, 1936, was however 20 per cent ahead of November a year ago. Average monthly sales for the first 11 months this year registered were 18 per cent better than during the same period of 1935.

Detailed figures compiled from NSPA member reports follow:

Monthly Sales Index for November

(Average Monthly Sales 1934 = 100)	Nov. 1936	Oct. 1936	Nov. 1935	11 Months 1936	11 Months 1935
NSPA Automotive Sales Index	134	136	112	136	115
Replacement Parts Shipped to Wholesalers	121	133	89	125	105
Service Equipment and Tools to Who'esalers	109	137	121	136	120
Original Equipment to Vehicle Manufacturers	223	182	194	181	145
Export Shipments	89	112	100	97	95

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This motor protection, as used by this fleet owner, is also used by the manufacturer of his cars and trucks—a special protection as insurance against excessive engine wear. This special motor protection is best in United Oil Bath air cleaners which are used in large quantities by leading car, truck and farm tractor manufacturers where atmospheric conditions are favorable to rapid engine wear. Full particulars gladly submitted on request.

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